Appendix T: Authority To Construct Application

RAMCO

6362 FERRIS SQUARE, SUITE C
SAN DIEGO, CALIFORNIA 92121
(858) 452-5963
FAX (858) 453-0625
Home FAX (858) 459-3550
Email: ram@ramcogen.net

RICHARD A. McCORMACK
President

May 11, 2001

Mr. Michael Lake, Chief
San Diego Air Pollution Control District
9150 Chesapeake Drive
San Diego, CA 92123

SUBJECT: RAMCO, Incorporated
Authority to Construct Permit Application for Modification to Chula Vista Power Plant (Application No. 976131)

Dear Mr. Lake:

RAMCO, Inc. submits the enclosed permit modification for the addition of a simple cycle gas turbine at the Chula Vista Power Plant. This submittal is intended to replace (in full, for your convenience) the information provided on March 15, 2001. This submittal represents the following:

- Turbine Selection and Supplemental Form – The Pratt & Whitney FT4C-3F has been chosen. As a result, the turbine output and heat rate have been revised on the APCD supplemental form, accordingly.

- Control Technology Proposal – The initial installation will be equipped with Dry Low-NOx burners (DLN). The final installation of the gas turbine will be retrofitted and equipped with selective catalytic reduction (SCR) and an oxidation catalyst (Ox-Cat). The final selected vendor information will be provided upon availability of the chosen vendor and equipment's guaranteed performance. Emissions and operating scenarios have been revised.

- BACT Summary – We propose to meet the guidance set forth by the California Air Resources Board for simple cycle gas turbines.

- Air Quality Modeling and Health Risk Assessment Summaries – Summaries of the resulting modeling analysis are provided. The modeling information (e.g., input/output files, BPIP, summaries, etc.) will be provided by electronic format.

As mentioned in our original submittal, RAMCO, Inc. is requesting expedited permit review and approval to address this capacity shortage. Concurrently, we are submitting this information to the California Energy Commission pursuant to the provisions of Executive Order D-26-01 and California's emergency 21-day power plant permitting process.

Thank you for your on-going support in review of this application. We look forward to the completion of your review. Meanwhile, if you have any questions, please don't hesitate to call me at 858-452-5963 or Shirley Rivera (Consultant to RAMCO, Inc.) at 619-497-0120.

Sincerely,

Richard McCormack
President

Expansion Emergency Power Plant Permitting Application

RAMCO, Inc.

Chula Vista Peaker Generating Station

Submitted to:

San Diego Air Pollution Control District

Submitted By:

RAMCO, Inc.

Revised

May 11, 2001

APCD APPLICATION FORMS

APCD 16 (Rev. 10/97)

SAN DIEGO AIR POLLUTION CONTROL DISTRICT
9150 CHESAPEAKE DRIVE, SAN DIEGO CA 92123-1096
PHONE (619) 694-3307 • FAX (619) 694-2730

PERMIT / REGISTRATION APPLICATION

FILING THIS APPLICATION DOES NOT GRANT PERMISSION TO CONSTRUCT OR TO OPERATE EQUIPMENT

IMPORTANT REMINDERS: Read instructions on the reverse side of this form prior to completing this application. Please ensure that all of the following are included before you submit the application:

☐ Appropriate Permit Fee ☐ Completed Supplemental Form(s) ☐ Signature on Application

REASON FOR SUBMITTAL OF APPLICATION: (check the appropriate item and enter Application (AP) or Permit to Operate (PO) number if required)

1. ☒ New Installation
2. ☐ Existing Unpermitted Equipment or Rule 11 Change
3. ☐ Modification of Existing Permitted Equipment
4. ☒ Amendment to Existing Authority to Construct or AP
5. ☐ Change of Equipment Location
6. ☒ Change of Equipment Ownership
7. ☐ Change of Permit Conditions
8. ☐ Change Permit to Operate Status to Inactive
9. ☐ Banking Emissions
10. ☐ Registration of Portable Equipment
11. ☒ Other (Specify) additional turbine
12. List affected AP/PO#(s): 976131

APPLICANT INFORMATION

13. Name of Business (DBA) RAMCO, Incorporated
14. Nature of Business Power generation
15. Does this organization own or operate any other APCD permitted equipment at this or any other adjacent locations in San Diego County? ☐ Yes ☒ No
    If yes, list assigned location ID's listed on your PO's
16. Type of Ownership ☒ Corporation ☐ Partnership ☐ Individual Owner ☐ Government Agency ☐ Other
17. Name of Legal Owner (if different from DBA)

		A. Equipment Owner	B. Authority to Construct (if different from A)
18.	Name	RAMCO, Inc.	
19.	Mailing Address	6362 Ferris Street, Suite C	
20.	City	San Diego	
21.	State	CA Zip 92121	Zip
22.	Phone	(858) 452-5963 FAX (858) 453-0625	( ) FAX ( )

		C. Permit to Operate (if different from A)	D. Billing Information (if different from A)
23.	Name		
24.	Mailing Address		
25.	City		
26.	State	Zip	Zip
27.	Phone	( ) FAX ( )	( ) FAX ( )

EQUIPMENT/PROCESS INFORMATION: Check Type of Equipment: ☒ **Stationary** ☐ **Portable - Will operation exceed 180 days:** ☒ **Yes** ☐ **No**

28. Equipment Location Address 3497 Main Street City Chula Vista
29. State CA Zip 91911 Phone ( ) FAX ( )
30. Site Contact Title Phone ( )
31. General Description of Equipment/Process Simple cycle, natural gas-fired combustion turbine designed to meet regional transmission system and local distribution grid support requirements as well as providing local and regional electrical needs in the San Diego region during periods of high electricity demand.
32. Application Submitted by ☐ Owner ☐ Operator ☐ Contractor ☒ Consultant Affiliation

I hereby certify that all information provided on this application is true and correct.

33. SIGNATURE James A. Westbrook Date 5/11/01
34. Print Name James A. Westbrook Title President
35. Company Westbrook Environmental, Inc. Phone (858) 538-9668 x 202

APCD USE ONLY

AP # ID # Cust. No. Sector: UTM's X Y SIC

Receipt # Date Amt Rec'd $ Fee Code

Engineering Contact Fee Code AP Fee $ T&M Renewal Fee $

Refund Claim # Date Amt $

Application Generated By NV# NC # Other Date Inspector

8/99 - jfo

SAN DIEGO AIR POLLUTION CONTROL DISTRICT

PERMIT / REGISTRATION APPLICATION

APPLICATION INSTRUCTIONS - FORM APCD 16

GENERAL

1. The owner or designated agent must complete and sign this multi-copy form and file it with one copy of all attachments, required supplementary forms, drawings and the appropriate fee.
2. The appropriate fee (payable to "County of San Diego APCD") shall be forwarded with this Permit/Registration Application. Application processing will not begin until the full required fee has been received. Excess fees will be refunded upon completion of the application process. If you do not know the appropriate fee or need to discuss the information required, please contact the District at (619) 694-3307 and ask for the Engineering Division.

REASON FOR SUBMITTAL OF APPLICATION

1. New Installation - check if you are installing equipment that does not currently have a District Permit to Operate.
2. Existing Unpermitted Equipment or Rule 11 Change - check if applying for installed existing equipment that is currently unpermitted or equipment that is now subject to District Rules due to Rule 11 changes.
3. Modification of Existing Permitted Equipment - check if you are making a change to equipment with a current District Permit to Operate. (List affected PO #(s) on line 12)
4. Amendment to Existing Authority to Construct or Permit/Registration Application - check this line if you are amending a previously submitted application form or if amending a current Authority to Construct. (List affected Application #(s) on line 12)
5. Change of Equipment Location - check if you are moving non-portable equipment with a current District Permit to Operate. (List affected PO #(s) on line 12)
6. Change of Equipment Ownership - check if you are now the owner of equipment with a current District Permit to Operate under a different owner. (List affected PO #(s) on line 12)
7. Change of Permit Conditions - check if equipment with a current Permit to Operate requires changes to the existing operating conditions. (List affected PO #(s) on line 12)
8. Change Permit to Operate Status to Inactive - check if you wish to maintain your current Permit to Operate but are not going to operate the equipment. (List affected PO #(s) on line 12)
9. Banking Emissions - check if you are retiring equipment with a current District Permit to Operate and wish to bank the emissions for future credits. (List affected PO #(s) on line 12)
10 Registration of Portable Equipment - check this line if you are applying for registration of portable equipment.
11. Other - check for any action not covered by #(s) 1 thru 10.
12. List affected AP/PO#(s) - if you checked #'s 3 or 5-9, list current Permit to Operate Number(s) affected or if you checked #4, list existing Application number whether or not an Authority to Construct has been issued.

APPLICANT INFORMATION

13 thru 17 are self-explanatory.
18 thru 27 are self-explanatory, complete Items B, C, and D only if different from Item A.

EQUIPMENT/PROCESS INFORMATION

Check Stationary (e.g. gasoline service site, dry cleaning facility, etc.) or Portable (abrasive blast pot, roofing kettle, etc.) depending upon the type of equipment for which you are filing an application. Also check Yes if the equipment is portable and will operate more than 180 consecutive days at a single site. Otherwise, check No.

28 thru 36 are self-explanatory.

SAN DIEGO AIR POLLUTION CONTROL DISTRICT

SUPPLEMENTAL APPLICATION INFORMATION
FEE SCHEDULE 20 A, B, C

San Diego APCD Use Only
Appl. No.:
ID No.:

GAS TURBINE

(Please type or print the information requested below.)

Company Name: RAMCO, Incorporated

Equipment Address: 3497 Main Street, Chula Vista, CA 91911

A. EQUIPMENT AND PROCESS DESCRIPTION

ENGINE USE: *(Check all that apply.)*

Power Generation: 58.0 / 62.4 MW Steam Generation: _____

Other (Specify capacity.): 12,784/12,784 Btu/kWh

ENGINE SPECIFICATIONS: **See BACT EVALUATION for vendor equipment specifications**

Manufacturer: Pratt & Whitney (twin pak) Model No.: FT4C-3F S/N: _____

HP Rating: _____ Fuel Consumption Rate: 741.5 / 797.7 (HHV) MM BTU/HR

1. Type of Liquid Fuel Used*: N/A Fuel Rate(Specify Units): _____

   Maximum %sulfur by wt. in fuel*: NA %

2. Type of Gaseous Fuel Used*: Natural Gas Fuel Rate: 37,075/39,887 cfh

   Maximum Grains PM/100DSCF @ 12% O_2: <= 1 grains/100dscf

B. EMISSION CONTROL EQUIPMENT: *(Check all that apply)*

X Low NOx burner __ Water injection

X SCR w/ Ammonia injection __ Hydrogenous X Aqeuous

Describe the control equipment to be installed and submit its technical data:

Initial installation will be dry low-NOx (DLN) burners. Final installation will be the retrofit of the DLN-equipped turbine with SCR and CO Ox-Cat. Turbine equipment is a twin-pak configuration (two engines). Values for both phases are denoted by Phase I number / Phase II number

C. EMISSION DATA **See EMISSION ESTIMATES for worst-case emissions**

Provide the manufacturer's specifications and emission factors (lbs/1,000 lbs of fuel) for oxides of nitrogen (NOx), Carbon monoxide (CO), Hydrocarbons (HC), and particulate matter (PM) for the engine at different power settings with corresponding engine exhaust flow rates and temperatures.

D. EXHAUST STACK AND BLDG. DIMENSIONS *(if air quality modeling is required).*

Stack location: Ground (i.e., roof top, wall, ground), direction: X vertical __ horizontal

Stack dimensions: internal 117 / 268.5 in. diameter, or__ in. wide x ___ in. long

Stack dimensions: external -- ft. diameter, or -- ft. wide x -- ft. long

(*If other shape, then supply sketch of stack cross section*)

See AIR QUALITY MODELING IMPACTS for BPIP, e.g., stack locations, building dimensions

Use an attached page to provide this information for each engine at each power setting.

Stack height: Above roof: n/a ft. Above ground level: 37 ft 4 in / 40 ft .

Site elevation above mean sea level (MSL) 670 ft.

Building dimensions: length 116.7 / 135.4 ft.; width 20 / 38 ft.; height 10 / 35 ft.

(*Supply sketch w/position of exhaust stack*)

Supply a plot plan showing the test cell/stand location with respect to nearby streets, property lines, and buildings.

See AIR QUALITY MODELING IMPACTS for stacks, building dimensions; see attached figures.

E. OTHER EMISSION PRODUCING EQUIPMENT AT THE SITE

APCD permitted X yes __ no

Non permitted __ yes X no

F. Additional Information DISKETTES of ISC and BUILDING PARAMETERS INPUT and OUTPUT DATA provided. This is one simple cycle turbine package.

G. Operating Schedule:* Hours/day: see emissions Days/yr: see emissions

*Emission calculations will be performed using these values and permit conditions may result to comply with applicable rules.

Name of Preparer: James A. Westbrook **Title:** President,WEI

Phone No.: (858) 538-9668 x 202 **Date:** May 11, 2001

NOTE TO APPLICANT:

Before acting on an application for Authority to Construct, Permit to Operate, or Permit to Sell or Rent, the District may require further information, plans, or specifications. Forms with insufficient information may be returned to the applicant for completion, which will cause a delay in application processing and may increase processing fees. The applicant should correspond with equipment and material manufacturers to obtain the information requested on this supplemental form.

EMISSION ESTIMATES

Emission Scenarios
Emission Estimates

MEMORANDUM
May 10, 2001

TO: RAMCO, Inc.

FROM: Shirley F. Rivera

cc: Westbrook Environmental, Inc./ James Westbrook, Tim Martin

SUBJECT: **Chula Vista II – Modification to Application No. 976131**
Emission Scenarios for 2 Turbine Plant

SUMMARY. The following describes the emission scenarios considered for the operation of the Chula Vista Power Plant over the life of the project.

- **CASE A – Final Project:** Chula Vista I equipped with DLN and SCR. Chula Vista II equipped with DLN, SCR and CO Oxidation Catalyst (Ox-Cat).
- **CASE B – Interim Phase:** Chula Vista I is equipped with DLN/SCR; Chula Vista II is equipped with DLN only.

Chula Vista I is an existing simple cycle gas turbine operational in early Summer 2001; Chula Vista II is a proposed simple cycle gas turbine system for operation in late Summer 2001. The subject of this modification is Chula Vista II.

For the purposes of nomenclature, the following summarizes the terminology used to identify the turbines in this memo, the companion emissions workbook, the air quality modeling impacts summary, and the air quality modeling files for this Authority to Construct Permit Application:

- Chula Vista I: Referred to as GT1 (e.g., gas turbines 1 or the existing gas turbines, 44.0 MW)
- Chula Vista II: Referred to as GT2 (e.g., gas turbines 2 or the proposed gas turbines)
    - Phase I, Interim Phase or initial installation refers to GT2 equipped with DLN only. (Chula Vista I is equipped with DLN/SCR.)
    - Phase II, Final Project refers to GT2 equipped with DLN, SCR and CO Ox-Cat. (Chula Vista I is equipped with DLN/SCR.)

Below briefly describes the following information regarding equipment operations. More details are presented in the subsequent sections. A discussion is provided regarding the emissions expected during commissioning and normal operations of the gas turbines at the power plant.

- **CASE A: Concurrent operations (worst case) for operation of Chula Vista I (GT1) and Chula Vista II (GT2).** This presents the emissions for the proposed plant. Both turbines are equipped with DLN and SCR. The second turbine is equipped with an oxidation catalyst (Ox-Cat). Annual hours and hourly emission rates are presented.

- **CASE B: Concurrent operations (worst case) for operation of Chula Vista I (GT1) and Chula Vista II (GT2).** This presents the year 2001 operations for the interim phase of the final project. Chula Vista I (GT1) and Chula Vista II (GT2) is in operation. The existing Chula Vista I is equipped with DLN/SCR. The proposed Chula Vista II is equipped with DLN only. Annual hours and hourly emission rates are presented.

- **EQUIPMENT OPERATIONS DESCRIPTION.** Each phase of the project is described. These include the following:
  - Chula Vista I (GT1) Installation and Operation – Description of existing turbine installation and operation. Summary of emissions for GT1, e.g., commissioning, normal.
  - Chula Vista II (GT2, DLN only) Installation and Operation – Description of proposed Chula Vista II turbine operation. Summary of emissions for Chula Vista II (GT2) with DLN, e.g., commissioning, normal.
  - Chula Vista I (GT1) and Chula Vista II (GT2, DLN only) Operations – Description of interim phase of the project, both turbines are in operation. Summary of emissions for Chula Vista I (GT1) and Chula Vista II (GT2, DLN only) e.g., commissioning, normal.
  - Chula Vista II (GT2, retrofit with SCR and Ox-Cat) Installation and Operation – Description of turbine retrofit with SCR and Ox-Cat installation and operation. Summary of emissions for Chula Vista II (GT2, DLN, SCR, Ox-Cat), e.g., commissioning, normal.
  - Chula Vista I (GT1) and Chula Vista II (GT2, retrofit with SCR and Ox-Cat) Operations – Description of final plant operation. Summary of emissions for Chula Vista I (GT1) and Chula Vista II (GT2) with both turbines equipped with DLN/SCR. Chula Vista II also equipped with an Ox-Cat. This is the final project. Summary of emissions for both turbines.

Emissions Information. The attachment includes an Excel workbook that contains the emissions related data in support of the expected operations and air quality impact analysis. Below summarizes the content of each excel worksheet.

Page	File	Description
1	Chula Vista_Data Sheet	Presents the turbine assumptions, e.g., heat rate, capacity
2	CV_Existing GT1 Data	Chula Vista I: Presents the Chula Vista I (GT1) turbine assumptions, e.g., heat rate, capacity, emission assumptions. (The existing turbine with DLN/SCR.)
3	CV_Exist GT1-Reg Thresholds	Chula Vista I: Presents the Chula Vista I (GT1) emissions compared to the San Diego APCD regulatory thresholds. Includes hours of operations for normal operations and for commissioning/tuning period.

Page	File	Description
4	CV_Phase I-GT2 Data	Chula Vista II: Presents the Chula Vista II (GT2) turbine assumptions during the Interim Phase, e.g., heat rate, capacity, and emission assumptions. Chula Vista II equipped with DLN only.
5	CV_Phase I-GT2 Reg Thresholds	Chula Vista II: Presents the Chula Vista II (GT2) emissions during the Interim Phase compared to the San Diego APCD regulatory thresholds. Includes hours of operations for normal operations and for commissioning/tuning period.
6	CV_Phase II-GT2 Data	Chula Vista II: Presents the Chula Vista II (GT2) turbine assumptions at Final Project, e.g., heat rate, capacity, and emission assumptions. Chula Vista II equipped with DLN, SCR and Ox-Cat.
7	CV_Phase II GT2-Reg Thresholds	Chula Vista II: Presents the Chula Vista II (GT2) emissions at Final Project compared to the San Diego APCD regulatory thresholds. Includes hours of operations for normal operations and for commissioning/ tuning period.
8	CV_CASE A-GT1 + GT2 (2)	Chula Vista I and II: Presents the Final Project operations of Chula Vista I (GT1, with DLN/SCR) and Chula Vista II (GT2, with DLN, SCR and Ox-Cat). Includes 3 emission cases: A (1) Both turbines operating concurrently, A(2a) Chula Vista I operations only, A(2b) Chula Vista II operations only.
9	CV_CASE B-GT1 + GT2 (1)	Chula Vista I and II: Presents the project operations of Chula Vista I (GT1, with DLN/SCR) and Chula Vista II (GT2, DLN only). Includes 3 emission cases: B(1) Both turbines operating concurrently, B(2a) Chula Vista I operations only, B(2b) Chula Vista II operations only.
10	CV_CASE C-GT1 + GT2(1) Variance	Chula Vista I and II: Presents normal operations of Chula Vista I (GT1, with DLN/SCR) and concurrent operations during the variance period of Chula Vista II (GT2, DLN only). Includes 3 emission cases: C(1) Both turbines operating where Chula Vista I is in normal operations and Chula Vista II is undergoing commissioning, C(2a) Chula Vista I normal operations only, C(2b) Chula Vista II commissioning only.

CASE A: Concurrent operations (worst case) for operation of Chula Vista I (GT1) and Chula Vista II (GT2).

Case A represents normal operations for the power plant. That is, both turbines are equipped with DLN/SCR. Chula Vista II (GT2) is also equipped with an Ox-Cat.

- Chula Vista I and II equipped with DLN/SCR; Chula Vista II also equipped with an Ox-Cat.
- NOx emissions are both at 5.0 ppm.

- CO emissions are at 6.0 ppm, and VOC emissions are at 2.0 ppm.
- Total emissions will remain under ≤ 50 TPY NOx and ≤ 250 TPY CO for the facility.
- Facility hours of operation will be commensurate with NOx and CO emissions below major source threshold.

Emission scenarios:

1. GT1 and GT2 operating concurrently: Annual hours = 3,325
2. GT1 only: Annual hours = 4,620
3. GT2 only: Annual hours = 6,250

Condition: Total facility emissions will be no greater than 50 TPY NOx and no greater than 250 TPY CO. Hours of operation for each turbine will be monitored and recorded. Emissions associated with hours of operation will be calculated to ensure total facility emissions remain below the above-stated NOx and CO emission levels. Emissions will be monitored via continuous emissions monitoring equipment. Emissions will be determined as follows:

Annual: [(mass, lb/hr Chula Vista I)*(hours Chula Vista I)/2000 +
(mass, lb/hr Chula Vista II)*(hours Chula Vista II)/2000] = total tons

Compliance: Total tons of NOx in a calendar year shall be no greater than 50. Total tons of CO in a calendar year shall be no greater than 250.

Summary of Hourly Emissions. Table A presents a summary of the hourly emission rates used for the air quality modeling impacts.

Table A: Case A Hourly Emission Rates (Normal Operations)

Pollutant	Chula Vista I (lb/hr)	Chula Vista II (lb/hr)
NOx	14.07	15.99
CO	108.00	10.73
PM10	4.54	5.27
VOC	1.89	2.04
SO2	1.58	2.71

CASE B: Concurrent operations (worst case) for operation of Chula Vista I (GT1) and Chula Vista II (GT2).

Case B represents normal operations for the power plant when Chula Vista I (GT1) and Chula Vista II (GT2, DLN only) is on-line. Under this Case, Chula Vista II is equipped with DLN. The duration of operations of Chula Vista II with DLN only is expected to be until the delivery and installation of the SCR and will occur no later than June 2002. Chula Vista II will later be retrofitted with SCR and Ox-Cat upon catalyst availability and prior to June 2002.

- Chula Vista I equipped with DLN/SCR; NOx emissions at 5.0 ppm.
- Chula Vista II equipped with DLN; NOx emissions at 25 ppm.

- Total emissions will remain under ≤ 50 TPY NOx and ≤ 250 TPY CO for the facility.
- Facility hours of operation will be commensurate with NOx and CO emissions below major source threshold.

Emission scenarios:

1. GT1 and GT2 operating concurrently: Annual hours = 1,130
2. GT1 only: Annual hours = 4,620
3. GT2 only: Annual hours = 1,340

Condition: Total facility emissions will be no greater than 50 TPY NOx and no greater than 250 TPY CO. Hours of operation for each turbine will be monitored and recorded. Emissions associated with hours of operation will be calculated to ensure total facility emissions remain below the above-stated NOx and CO emission levels. Emissions will be monitored via continuous emissions monitoring equipment (CEMS). Emissions will be determined as follows:

Annual: [(mass, lb/hr Chula Vista I)*(hours Chula Vista I)/2000 +
(mass, lb/hr Chula Vista II)*(hours Chula Vista II)/2000] = total tons

Compliance: Total tons of NOx in a calendar year shall be no greater than 50. Total tons of CO in a calendar year shall be no greater than 250.

Summary of Hourly Emissions. Table B presents a summary of the hourly emission rates used for the air quality modeling impacts.

Table B: Case B Hourly Emission Rates

Pollutant	Chula Vista I (lb/hr)	Chula Vista II (lb/hr)
NOx	14.07	74.33
CO	108.00	116.39
PM10	4.54	4.89
VOC	1.89	9.50
SO2	1.58	2.52

Equipment Operations Description. Chula Vista I (GT1) is equipped with DLN and SCR for NOx control to 5.0 ppm. Chula Vista I will be on-line in early summer 2001. Bringing Chula Vista II (GT2) on-line will proceed in two phases. The initial installation of Chula Vista II will be with DLN for NOx control to 25 ppm which is expected to occur in late-summer 2001. Chula Vista II will be retrofitted with SCR for NOx control to 5.0 ppm and with an Ox-Cat for CO and VOC emissions to 6.0 ppm and 2.0 ppm, respectively. Installation of SCR and Ox-Cat controls depend on availability and will occur no later than June 2002. During the installation of DLN and retrofit of SCR and Ox-Cat for Chula Vista I, Chula Vista I and Chula Vista II will be operated in a manner to minimize the facility emissions and ensure that the major source thresholds are not exceeded.

Chula Vista I Installation and Operation: Chula Vista I is expected to be on-line in early summer 2001. It will undergo a commissioning period expected to be not longer than 168 hours. On any given day, Chula Vista I may be undergoing equipment and instrumentation optimization and testing. Commissioning will be limited to 12 hours/day. The expected commissioning period is 7 days. However, because of the need to ensure proper equipment installation and operations, and due to unforeseen events that may cause delay in completion of commissioning, another 7 days has been assumed as a worst-case duration for commissioning, for a total of 14 days or a tuning period not to exceed 168 hours.

During commissioning, the worst-case NOx emissions from Chula Vista I have been estimated at 50 ppm. After completion of commissioning, source testing will occur with the final NOx emissions at 5.0 ppm. For the period of commissioning, an APCD 90-day variance has been obtained. Emissions will be monitored during commissioning by the use of a portable CEMS, as required by the San Diego APCD. Other conditions placed upon Chula Vista I as a result of the variance proceedings will be adhered to. A permanent CEMS will be used during normal operations of Chula Vista I.

The hourly emissions for Chula Vista I operations are presented below in Table C.

Table C: Chula Vista I Hourly Emission Rates

Pollutant	Commissioning (lb/hr)	Normal (lb/hr)
NOx	137.95	14.07
CO	108.00	108.00
PM10	4.54	4.54
VOC	1.89	1.89
SO2	1.58	1.58

Additionally, during normal operations, it is expected that the overall hourly rate during a startup/shutdown of Chula Vista I will meet the hourly emissions expected during normal operations because of the 10-minute short duration of startup/shutdown necessary for this type of turbine.

Air quality modeling was conducted to determine the emissions impact during the commissioning period and during normal operations. This is presented in the Air Quality Impacts Analysis section, along with the associated Health Risk Assessment. Worst-case scenarios included:

- Uncontrolled NOx emissions during commissioning for not more than 12 hours/day, 14 days and 168 hours.
- Controlled emissions during normal operations for not more than 21 hours/day and 4,620 hours year.
- Emissions totaling not more than the applicable major source thresholds.
- Modeling for those pollutants that triggered the San Diego APCD's Air Quality Impact Analysis Thresholds: NOx, CO and PM10.

As a result, all total impacts (maximum modeled concentrations plus background) are below the California and National Ambient Air Quality Standards. Therefore, the proposed project would not be expected to cause or contribute to an exceedance of any air quality standard. Furthermore, the maximum health risk values for all operating scenarios are all less than the Rule 1200 requirements of a cancer risk less than 1 in one million and a non-cancer chronic and acute hazard index (HI) of less than 1.0.

Chula Vista II (GT2, DLN only) Installation and Operation: The installation of Chula Vista II will occur after the installation and operation of Chula Vista I. Depending on market conditions, Chula Vista I will be in operation during the construction and installation of Chula Vista II. It is expected that the duration of commissioning for Chula Vista II will be not more than 1-2 months. On any given day, Chula Vista II may be undergoing equipment and instrumentation optimization and testing. Daily hours will be limited to 12 hours/day. The longer commissioning period is anticipated because the DLN to be installed on this unit is "first-of-its-kind" for the selected turbine. The expected commissioning period is 1 –month. However, because of the need to ensure proper equipment installation and operations, and due to unforeseen events that may cause delay in completion of commissioning, a total of two months has been assumed as a worst-case duration for commissioning. Therefore, the commissioning period for Chula Vista II has been estimated at 50 days duration, or not more than 600 hours.

During commissioning, the worst-case NOx emissions from Chula Vista II are estimated at 50 ppm, and the worst-case CO emissions from Chula Vista II are estimated at 200 ppm. After completion of commissioning, source testing will occur with the final NOx emissions at 25 ppm and CO emissions at 70 ppm. For the period of commissioning, an APCD 90-day variance will be sought. Emissions will be monitored during commissioning by the use of a portable CEMS, as required by the San Diego APCD. A permanent CEMS will be used during normal operations of Chula Vista II.

The hourly emissions for Chula Vista I operations are presented above in Table C. Table D presents the Chula Vista II (GT2, DLN only) hourly emission rates.

Table D: Chula Vista II (DLN only) Hourly Emission Rates		
Pollutant	**Commissioning (lb/hr)**	**Normal (lb/hr)**
NOx	148.67	74.33
CO	332.55	116.39
PM10	4.89	4.89
VOC	9.50	9.50
SO2	2.52	2.52

Additionally, during normal operations, it is expected that the overall hourly rate during a startup/shutdown of Chula Vista II will meet the hourly emissions expected during normal operations because of the 10-minute short duration of startup/shutdown necessary for this type of turbine.

Air quality modeling was conducted to determine the emissions impact during the commissioning period and during normal operations. This is presented in the Air Quality Impacts Analysis section, along with the associated Health Risk Assessment. Worst-case scenarios included:

- Uncontrolled NOx emissions during commissioning for not more than 12 hours/day, 50 days and 600 hours.
- Controlled emissions during normal operations for not more than 24 hours/day and 1,340 hours year.
- Emissions totaling not more than the applicable major source thresholds.
- Modeling for those pollutants that triggered the San Diego APCD's Air Quality Impact Analysis Thresholds: NOx, CO and PM10.

As a result, all total impacts (maximum modeled concentrations plus background) are below the California and National Ambient Air Quality Standards. Therefore, the proposed project would not be expected to cause or contribute to an exceedance of any air quality standard. Furthermore, the maximum health risk values for all operating scenarios meet the Rule 1200 requirements of a cancer risk less than 1 in one million and a non-cancer chronic and acute HI of less than 1.0.

Chula Vista I and Chula Vista II, Phase I Operations: With respect to the concurrent operations of Chula Vista I and II, as previously discussed, these operations are presented as Case B. Under this Case, Chula Vista II is equipped with DLN. Chula Vista II will later be retrofitted with SCR and an Ox-Cat upon catalyst availability.

With respect to emissions impacts, total facility emissions will be no greater than 50 TPY NOx and no greater than 250 TPY CO. Hours of operation for each turbine will be monitored and recorded. Emissions associated with hours of operation will be calculated to ensure total facility emissions remain below the above-stated NOx and CO emission levels. Emissions will be monitored via continuous emissions monitoring equipment.

The hourly emissions for Chula Vista I and II operations are presented above in Table C and D, respectively. For convenience, Table E presents each turbine's hourly emission rates.

Table E: Chula Vista I and II (DLN only) Hourly Emission Rates		
Pollutant	**Chula Vista I**	**Chula Vista II**
NOx	14.07	74.33
CO	108.00	116.39
PM10	4.54	4.89
VOC	1.89	9.50
SO2	1.58	2.52

Additionally, during normal operations, it is expected that the overall hourly rates during a startup/shutdown of Chula Vista I and II will meet the hourly emissions expected during normal operations because of the 10-minute short duration of startup/shutdown necessary for this type of turbine.

Air quality modeling was conducted to determine the emissions impact during normal operations of these two turbines. The worst-case scenario included the operation of both turbines concurrently:

- Controlled NOx emissions during normal operations for not more than 24 hours/day, 1,130 hours/yr.
- Annual hours result in emissions totaling not more than the applicable major source thresholds.
- Modeling for those pollutants that triggered the San Diego APCD's Air Quality Impact Analysis Thresholds: NOx, CO and PM10.

As a result, all total impacts (maximum modeled concentrations plus background) are below the California and National Ambient Air Quality Standards. Therefore, the proposed project would not be expected to cause or contribute to an exceedance of any air quality standard. Furthermore, the maximum health risk values for all operating scenarios are all less than the Rule 1200 requirements of a cancer risk less than 1 in one million and a non-cancer chronic and acute HI of less than 1.0.

Chula Vista II (GT2) Installation and Operation: The retrofit of Chula Vista II (GT2) with SCR and an Ox-Cat will occur upon availability of the control technology equipment and no later than June 2002. Depending on market conditions, Chula Vista I will be in operation during the retrofit of Chula Vista II. Chula Vista II will undergo a commissioning period expected to be not longer than 14 days or 168 hours total. On any given day, Chula Vista II may be undergoing equipment and instrumentation optimization and testing. Daily hours will be limited to 12 hours/day. The expected commissioning period is 7 days. However, because of the need to ensure proper equipment installation and operations, and due to unforeseen events that may cause delay in completion of commissioning, another 7 days has been assumed as a worst-case duration for commissioning, for a total of 14 days or 168 hours.

During commissioning, the worst-case NOx emissions from Chula Vista II are estimated at 25 ppm. After completion of commissioning, source testing will occur with the final NOx emissions at 5.0 ppm. Likewise, the worst-case CO emissions from Chula Vista II are estimated at 70 ppm. After completion of commissioning, source testing will occur with the final CO emissions at 6.0 ppm. Additionally, it is expected that the VOC emissions from Chula Vista II will be not more than 2.0 ppm. For the period of commissioning, an APCD 90-day variance will be sought. Emissions will be monitored during commissioning by the use of a portable CEMS, as required by the San Diego APCD. A permanent CEMS will be used during normal operations of Chula Vista II.

The hourly emissions for Chula Vista I operations are presented above in Table C. Table F presents the Chula Vista II hourly emission rates.

Table F: Chula Vista II Hourly Emission Rates (DLN, SCR, Ox-Cat)

Pollutant	Commissioning (lb/hr)	Normal (lb/hr)
NOx	79.97	15.99
CO	125.22	10.73
PM10	5.27	5.27
VOC	10.22	2.04
SO2	2.71	2.71

Additionally, during normal operations, it is expected that the overall hourly rate during a startup/shutdown of Chula Vista II will meet the hourly emissions expected during normal operations because of the 10-minute short duration of startup/shutdown necessary for this type of turbine.

Air quality modeling was conducted to determine the emissions impact during the commissioning period and during normal operations. This is presented in the Air Quality Impacts Analysis section, along with the associated Health Risk Assessment. Worst-case scenarios included:

- Uncontrolled NOx emissions during commissioning for not more than 12 hours/day, 14 days and 168 hours.
- Controlled emissions during normal operations for not more than 24 hours/day and 6,250 hours year.
- Emissions totaling not more than the applicable major source thresholds.
- Modeling for those pollutants that triggered the San Diego APCD's Air Quality Impact Analysis Thresholds: NOx, CO and PM10.

As a result, all total impacts (maximum modeled concentrations plus background) are below the California and National Ambient Air Quality Standards. Therefore, the proposed project would not be expected to cause or contribute to an exceedance of any air quality standard. Furthermore, the maximum health risk values for all operating scenarios are all less than the Rule 1200 requirements of a cancer risk less than 1 in one million and a non-cancer chronic and acute HI of less than 1.0.

Chula Vista I and II Normal Operations: With respect to the concurrent operations of Chula Vista I and II, as previously discussed, these operations are presented as Case A. Under this Case, both Chula Vista I and II are equipped with DLN/SCR, and Chula Vista II is also equipped with an Ox-Cat.

With respect to emissions impacts, total facility emissions will be no greater than 50 TPY NOx and no greater than 250 TPY CO. Hours of operation for each turbine will be monitored and recorded. Emissions associated with hours of operation will be calculated to ensure total facility emissions remain below the above-stated NOx and CO emission levels. Emissions will be monitored via continuous emissions monitoring equipment.

The hourly emissions for Chula Vista I and II operations are presented above in Table A. For convenience, these emissions are presented below

Pollutant	Chula Vista I	Chula Vista II
NOx	14.07	15.99
CO	108.00	10.73
PM10	4.54	5.27
VOC	1.89	2.04
SO2	1.58	2.71

Air quality modeling was conducted to determine the emissions impact during normal operations of these two turbines. This is presented in the Air Quality Impacts Analysis section, along with the associated Health Risk Assessment. The worst-case scenario included the operation of both turbines concurrently:

- Controlled NOx emissions during concurrent operations for not more than 24 hours/day and 3,325 hours/year.
- Emissions totaling not more than the applicable major source thresholds.
- Modeling for those pollutants that triggered the San Diego APCD's Air Quality Impact Analysis Thresholds: NOx, CO and PM10.

As a result, all total impacts (maximum modeled concentrations plus background) are below the California and National Ambient Air Quality Standards. Therefore, the proposed project would not be expected to cause or contribute to an exceedance of any air quality standard. Furthermore, the maximum health risk values for all operating scenarios are all less than the Rule 1200 requirements of a cancer risk less than 1 in one million and a noncancer chronic and acute HI of less than 1.0.

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CHULA VISTA I: EXISTING GAS TURBINE EMISSION ESTIMATES AND
REGULATORY THRESHOLDS COMPARISON

[CHULA VISTA I] WORST-CASE EMISSIONS - 15,637 Heat Rate (HHV)

Assume:	44,000	kw	Turbine output		
	15,637	Btu/kW-hr	Heat rate (HHV)	688.03	MMBtu/hr (HHV)
	20,610	Btu/lb	Heat content	12.1	K-factor for NG pipeline gas
	33,383	lbs/hr	Fuel flow		
	1,000	Btu/scf	Natural gas heat value (HHV); typical APCD		

[CHULA VISTA II - GT2 OPERATIONS] WORST-CASE EMISSIONS - 11,559 Heat Rate (LHV)

Assume:	58,000	kw	Turbine output		
	11,559	Btu/kW-hr	Heat rate (LHV)	670.42	MMBtu/hr (LHV)
	12,784	Btu/kW-hr	Heat rate (HHV)	741.49	MMBtu/hr (HHV)
	20,610	Btu/lb	Heat content	HHV=	1.106 *LHV
	35,977	lbs/hr	Fuel flow (total, HHV)	12.1	K-factor for NG pipeline gas
	1,000	Btu/scf	Natural gas heat value (HHV); typical APCD		

[CHULA VISTA II - GT2 OPERATIONS] WORST-CASE EMISSIONS - 11,559 Heat Rate (LHV)

Assume:	62,400	kw	Turbine output		
	11,559	Btu/kW-hr	Heat rate (LHV)	721.28	MMBtu/hr (LHV)
	12,784	Btu/kW-hr	Heat rate (HHV)	797.74	MMBtu/hr (HHV)
	20,610	Btu/lb	Heat content	HHV=	1.106 *LHV
	38,706	lbs/hr	Fuel flow (total, HHV)	12.1	K-factor for NG pipeline gas
	1,000	Btu/scf	Natural gas heat value (HHV); typical APCD		

CHULA VISTA I: EXISTING GAS TURBINE EMISSION ESTIMATES AND
REGULATORY THRESHOLDS COMPARISON

[CHULA VISTA I] WORST-CASE EMISSIONS - 15,637 Heat Rate (HHV)

Assume:	44,000	kw	Turbine output		
	15,637	Btu/kW-hr	Heat rate	688.03	MMBtu/hr
	20,610	Btu/lb	Heat content	12.1	K-factor for NG pipeline gas
	33,383	lbs/hr	Fuel flow		
	1,000	Btu/scf	Natural gas heat value (HHV); typical APCD		

NOTE: Emission estimates are based on the "worst-case" turbine heat rate information. Total hourly, daily, and annual emissions have been updated and are below the major source regulatory trigger levels; the AQIA has been triggered for this worst-case scenario.

UNIT EMISSION FACTORS

Assume: F- Factor =	8710	dscf/MMBtu	
NOx @ 1 ppm =	1.194E-07	lb/scf	[NOx=46 lb/lb-mol]; Only used as reference for determining VOC conversion, lb/scf.
CO @ 1 ppm =	7.268E-08	lb/scf	[CO=28 lb/lb-mol]
VOC @ 1 ppm =	4.153E-08	lb/scf	[VOC as methane = 16 lb/lb-mol]
NH3 @ 1 ppm =	4.413E-08	lb/scf	[NH3 = 17 lb/lb-mol]

POLLUTANT	**BASELINE / VENDOR**			**EMISSION FACTORS (EMFACS)**		
NOx (tuning)	*50*	*ppmvd*	*15 % O2*	*137.95*	*lb/hr*	*K-factor; Estimate for NOx during tuning*
CO (tuning)	*70*	*ppmvd*	*15 % O2*	*0.157*	lb/MMBtu	F-factor; Pratt & Whitney FT4/GG4 with DLN
NOx (normal)	30	ppmvd	15 % O2	82.77	lb/hr	K-factor; Pratt & Whitney FT4/GG4 with DLN
CO	70	ppmvd	15 % O2	0.157	lb/MMBtu	F-factor; Pratt & Whitney FT4/GG4 with DLN
PM10	EPA AP-42		(as total = cond + filt)	0.0066	lb/MMBtu	EPA AP-42, Fifth Edition, Supplement F (Table 3.1-2a)
VOC (as TOC)	EPA AP-42		(as total organics)	0.011	lb/MMBtu	EPA AP-42, Fifth Edition, Supplement F (Table 3.1-2a)
VOC (portion)	Est. per CARB, EPA		approx: 25%	0.0028	lb/MMBtu	EPA AP-42 TOC speciation ≤ 25% is VOC; CARB ≤ 10%.
SO2	EPA AP-42 (05/98)		(default SO2 factor)	0.00230	lb/MMBtu	Based on 2.3 lb/MMscf; CPUC quality;

NOx PPM	**30**	**5**	SCR at:	83%	control efficiency

Pollutant	**lb/hr**	**lb/hr**	**NOTES**		
NOx (tuning)	*137.95*	*137.95*	*SCR at:*	*0%*	*control efficiency*
CO (tuning)	*108.00*	*108.00*	Based on 70 ppm (Pratt & Whitney)		
NOx (normal)	82.77	*remaining:*	17%	14.07	lbs/hr NOx
CO	108.00	108.00	Based on 70 ppm (Pratt & Whitney)		
PM10	4.54	4.54	Based on EPA AP-42		
VOC	1.89	1.89	Based on EPA AP-42 speciation re: TOC		
SO2	1.58	1.58	Based on EPA AP-42		

CHULA VISTA I: EXISTING GAS TURBINE EMISSION ESTIMATES AND
REGULATORY THRESHOLDS COMPARISON

[CHULA VISTA I] WORST-CASE EMISSIONS - 15,637 Heat Rate (HHV)

Assume:	44,000	kw	Turbine output		
	15,637	Btu/kW-hr	Heat rate	688.03	MMBtu/hr
	20,610	Btu/lb	Heat content	12.1	K-factor for NG pipeline gas
	33,383	lbs/hr	Fuel flow		
	1,000	Btu/scf	Natural gas heat value (HHV); typical APCD		

NOTE: Emission estimates are based on the "worst-case" turbine heat rate information. Total hourly, daily, and annual emissions have been updated and are below the major source regulatory trigger levels; the AQIA has been triggered for this worst-case scenario.

NSR PERMIT THRESHOLDS

TRIGGER LEVELS: Rule 20.1, et. al relevant trigger levels for permitting.

Pollutant	AQIA (lb/hr)	AQIA (lb/day)	AQIA (tons/yr)	BACT (lb/day)	Major Source (tons/yr)
NOx	25	250	40	10	50
CO	100	550	100	NA	250
PM10	---	100	15	10	100
VOC	NA	NA	NA	10	50
SO2	25	250	40	10	100

Normal Ops: 4,620 **hrs/year** 21 **hours/day**

Tuning Ops: 168 **hrs/tuning** 12 **hours/day** **commissioning period:** 14 **days (total max)**

Pollutant	lb/hr	(lb/day)	(tons/yr)	
NOx (tuning)	*137.95*	*1655.37*	*11.59*	[<=== estimated max. NOx tons/tuning & commissioning period.]
NOx (normal)	14.07	295.49	32.50	
CO	108.00	2268.04	249.48	[<=== CO tuning and normal operations are the same emission levels.]
PM10	4.54	95.36	10.49	
VOC	1.89	39.73	4.37	
SO2	1.58	33.23	3.66	

PROJECT EMISSIONS COMPARISONS: If trigger level comparison is > 0, then requirement is triggered.

Does project trigger permit threshold levels?

Pollutant	AQIA (lb/hr)	AQIA (lb/day)	AQIA (tons/yr)	BACT (lb/day)	Major Source (tons/yr)
NOx (tuning)	*112.95*	*1405.37*	*-28.41*	*1645.37*	*-38.41*
NOx (normal)	-10.93	45.49	-7.50	285.49	-17.50
CO	8.00	1718.04	149.48	NA	-0.52
PM10	--	-4.64	-4.51	85.36	-89.51
VOC	NA	NA	NA	29.73	-45.63
SO2	-23.42	-216.77	-36.34	23.23	-96.34

CHULA VISTA I: EXISTING GAS TURBINE EMISSION ESTIMATES AND
REGULATORY THRESHOLDS COMPARISON

[CHULA VISTA II - GT2 OPERATIONS] WORST-CASE EMISSIONS - 11,559 Heat Rate (LHV)

Assume:	58,000	kw	Turbine output		
	12,784	Btu/kW-hr	Heat rate (HHV)	741.49	MMBtu/hr (HHV)
	20,610	Btu/lb	Heat content	12.1	K-factor for NG pipeline gas
	35,977	lbs/hr	Fuel flow (total)		
	1,000	Btu/scf	Natural gas heat value (HHV); typical APCD		

Note: Operation in Phase I is for turbine with DLN only.
Turbine is equipped with 2 engines that total the turbine output noted above.

UNIT EMISSION FACTORS

Assume:	F- Factor =	8710	dscf/MMBtu	
NOx	@ 1 ppm =	1.194E-07	lb/scf	[NOx=46 lb/lb-mol]; Only used as reference for determining VOC conversion, lb/scf.
CO	@ 1 ppm =	7.268E-08	lb/scf	[CO=28 lb/lb-mol]
VOC	@ 1 ppm =	4.153E-08	lb/scf	[VOC as methane = 16 lb/lb-mol]
NH3	@ 1 ppm =	4.413E-08	lb/scf	[NH3 = 17 lb/lb-mol]

POLLUTANT	BASELINE / VENDOR			EMISSION FACTORS (EMFACS)		
NOx (tuning)	*50*	*ppmvd*	*15 % O2*	*148.67*	*lb/hr*	*K-factor; Estimate for NOx during tuning*
CO (tuning)	*200*	*ppmvd*	*15 % O2*	0.448	lb/MMBtu	F-factor; Pratt & Whitney FT4C-3F with DLN
NOx (normal)	25	ppmvd	15 % O2	74.33	lb/hr	K-factor; Pratt & Whitney FT4C-3F with DLN
CO	70	ppmvd	15 % O2	0.157	lb/MMBtu	F-factor; Pratt & Whitney FT4C-3F with DLN
PM10	EPA AP-42		(as total = cond + filt)	0.0066	lb/MMBtu	EPA AP-42, Fifth Edition, Supplement F (Table 3.1-2a)
VOC	10	ppmvd	15 % O2	0.013	lb/MMBtu	F-factor; Pratt & Whitney FT4C-3F with DLN
SO2	EPA AP-42		(default SO2 factor)	0.00340	lb/MMBtu	EPA AP-42, Fifth Edition, Supplement F (Table 3.1-2a)

NOx PPM	**25**		SCR at:	0% control efficiency
CO PPM	**70**		Ox-Cat at:	0% control efficiency

Pollutant	lb/hr	lb/hr	NOTES
NOx (tuning)	*148.67*	*148.67*	*SCR at: 0% control efficiency*
CO (tuning)	*332.55*	*332.55*	*Tuning period.*
NOx (normal)	74.33	74.33	Based on 25 ppm
CO	116.39	116.39	*Ox-Cat at: 0% control efficiency*
PM10	4.89	4.89	Based on EPA AP-42
VOC	9.50	9.50	Based on Pratt & Whitney estimate
SO2	2.52	2.52	Based on EPA AP-42

CHULA VISTA I: EXISTING GAS TURBINE EMISSION ESTIMATES AND
REGULATORY THRESHOLDS COMPARISON

[CHULA VISTA II - GT2 OPERATIONS] WORST-CASE EMISSIONS - 11,559 Heat Rate (LHV)

Assume:	58,000	kw	Turbine output		
	12,784	Btu/kW-hr	Heat rate (HHV)	741.5	MMBtu/hr (HHV)
	20,610	Btu/lb	Heat content	12.1	K-factor for NG pipeline gas
	35,977	lbs/hr	Fuel flow (total)		
	1,000	Btu/scf	Natural gas heat value (HHV); typical APCD		

Note: Operation in Phase I is for turbine with DLN only.
Turbine is equipped with 2 engines that total the turbine output noted above.

NSR PERMIT THRESHOLDS

TRIGGER LEVELS: Rule 20.1, et. al relevant trigger levels for permitting.

Pollutant	AQIA (lb/hr)	AQIA (lb/day)	AQIA (tons/yr)	BACT (lb/day)	Major Source (tons/yr)
NOx	25	250	40	10	50
CO	100	550	100	NA	250
PM10	---	100	15	10	100
VOC	NA	NA	NA	10	50
SO2	25	250	40	10	100

Normal Ops:	**1,340**	**hrs/year**	**24**	**hours/day**	
Tuning Ops:	**600**	**hrs/tuning**	**12**	**hours/day**	**commissioning period: 50 days (total max)**

Pollutant	lb/hr	(lb/day)	(tons/yr)	
NOx (tuning)	*148.67*	*1783.99*	*44.60*	[<=== estimated max. NOx tons/tuning & commissioning period]
CO (tuning)	*332.55*	3990.63	*99.77*	[<=== estimated max. CO tons/tuning & commissioning period]
NOx (normal)	74.33	1783.99	49.80	
CO	116.39	2793.44	77.98	
PM10	4.89	117.45	3.28	
VOC	9.50	228.03	6.37	
SO2	2.52	60.51	1.69	

PROJECT EMISSIONS COMPARISONS: If trigger level comparison is > 0, then requirement is triggered.

Does project trigger permit threshold levels?

Pollutant	AQIA (lb/hr)	AQIA (lb/day)	AQIA (tons/yr)	BACT (lb/day)	Major Source (tons/yr)
NOx (tuning)	*123.67*	*1533.99*	*4.60*	*1773.99*	*-5.40*
CO (tuning)	*232.55*	*3440.63*	*-0.23*	NA	*-150.23*
NOx (normal)	49.33	1533.99	9.80	1773.99	-0.20
CO	16.39	2243.44	-22.02	NA	-172.02
PM10	--	17.45	-11.72	107.45	-96.72
VOC	NA	NA	NA	218.03	-43.63
SO2	-22.48	-189.49	-38.31	50.51	-98.31

CHULA VISTA I: EXISTING GAS TURBINE EMISSION ESTIMATES AND
REGULATORY THRESHOLDS COMPARISON

[CHULA VISTA II - GT2 OPERATIONS] WORST-CASE EMISSIONS - 11,559 Heat Rate (LHV)

Assume:	62,400	kw	Turbine output		
	12,784	Btu/kW-hr	Heat rate (HHV)	797.74	MMBtu/hr (HHV)
	20,610	Btu/lb	Heat content	12.1	K-factor for NG pipeline gas
	38,706	lbs/hr	Fuel flow (total)		
	1,000	Btu/scf	Natural gas heat value (HHV); typical APCD		

Note: Operation in Phase II is for the turbine with DLN, SCR and Ox-Cat.
Turbine is equipped with 2 engines that total the turbine output noted above.

UNIT EMISSION FACTORS

Assume: F- Factor =	8710	dscf/MMBtu	
NOx @ 1 ppm =	1.194E-07	lb/scf	[NOx=46 lb/lb-mol]; Only used as reference for determining VOC conversion, lb/scf.
CO @ 1 ppm =	7.268E-08	lb/scf	[CO=28 lb/lb-mol]
VOC @ 1 ppm =	4.153E-08	lb/scf	[VOC as methane = 16 lb/lb-mol]
NH3 @ 1 ppm =	4.413E-08	lb/scf	[NH3 = 17 lb/lb-mol]

POLLUTANT	**BASELINE / VENDOR**			**EMISSION FACTORS (EMFACS)**		
NOx (tuning)	*25*	*ppmvd*	*15 % O2*	*79.97*	*lb/hr*	*K-factor; Estimate for NOx during tuning*
CO (tuning)	*70*	*ppmvd*	*15 % O2*	0.157	lb/MMBtu	F-factor; Pratt & Whitney FT4C-3F with DLN, SCR, Ox-Cat
VOC (tuning)	*10*	*ppmvd*	*15 % O2*	0.013	lb/MMBtu	F-factor; Pratt & Whitney FT4C-3F with DLN, SCR, Ox-Cat
NOx (normal)	5	ppmvd	15 % O2	15.99	lb/hr	K-factor; Pratt & Whitney FT4C-3F with DLN, SCR, Ox-Cat
CO (normal)*	6	ppmvd	15 % O2	0.013	lb/MMBtu	F-factor; Pratt & Whitney FT4C-3F with DLN, SCR, Ox-Cat
PM10	EPA AP-42		(as total = cond + filt)	0.0066	lb/MMBtu	EPA AP-42, Fifth Edition, Supplement F (Table 3.1-2a)
VOC*	2	ppmvd	15 % O2	0.0026	lb/MMBtu	F-factor; Pratt & Whitney FT4C-3F with DLN, SCR, Ox-Cat
SO2	EPA AP-42		(default SO2 factor)	0.00340	lb/MMBtu	EPA AP-42, Fifth Edition, Supplement F (Table 3.1-2a)

NOx PPM	**25**	**5**	SCR at:	80%	control efficiency
CO PPM	**70**	**6**	Ox-Cat at:	91.4%	control efficiency

Pollutant	**lb/hr**	**lb/hr**	**NOTES**			
NOx (tuning)	*79.97*	*79.97*	*SCR at:*	*0%*	*control efficiency*	
CO (tuning)	*125.22*	*125.22*	*Tuning period.*			
VOC (tuning)	*10.22*	*10.22*	*Tuning period.*			
NOx (normal)	79.97	*remaining:*	20%	15.99	lb/hr	
CO* (normal)	125.22	*remaining:*	8.6%	10.73	lb/hr	
PM10	5.27	5.27	Based on EPA AP-42			
VOC*	2.04	2.04	Based on F-factor			
SO2	2.71	2.71	Based on EPA AP-42			

*NOTE: CO and VOC normal operations estimate based on CO Ox-Cat target to meet ARB BACT Guidance for simple cycle gas turbines.

CHULA VISTA I: EXISTING GAS TURBINE EMISSION ESTIMATES AND
REGULATORY THRESHOLDS COMPARISON

[CHULA VISTA II - GT2 OPERATIONS] WORST-CASE EMISSIONS - 11,559 Heat Rate (LHV)

Assume:	62,400	kw	Turbine output		
	12,784	Btu/kW-hr	Heat rate (HHV)	797.74	MMBtu/hr (HHV)
	20,610	Btu/lb	Heat content	12.1	K-factor for NG pipeline gas
	38,706	lbs/hr	Fuel flow (total)		
	1,000	Btu/scf	Natural gas heat value (HHV); typical APCD		

Note: Operation in Phase II is for the turbine with DLN, SCR and DLN.
Turbine is equipped with 2 engines that total the turbine output noted above.

NSR PERMIT THRESHOLDS
TRIGGER LEVELS: Rule 20.1, et. al relevant trigger levels for permitting.

Pollutant	AQIA (lb/hr)	AQIA (lb/day)	AQIA (tons/yr)	BACT (lb/day)	Major Source (tons/yr)
NOx	25	250	40	10	50
CO	100	550	100	NA	250
PM10	---	100	15	10	100
VOC	NA	NA	NA	10	50
SO2	25	250	40	10	100

Normal Ops: 6,250 **hrs/year** 24 **hours/day**
Tuning Ops: 168 **hrs/tuning** 12 **hours/day** **commissioning period:** 14 **days (total max)**

Pollutant	lb/hr	(lb/day)	(tons/yr)	
NOx (tuning)	*79.97*	*959.66*	*6.72*	[<=== estimated max. NOx tons/tuning & commissioning period]
NOx (normal)	15.99	383.86	49.98	[<=== NOx emissions; SCR]
CO (tuning)	125.22	1502.68	10.52	[<=== estimated max. CO tons/tuning & commissioning.]
CO (normal)	10.73	257.60	33.54	[<=== CO emissions; CO oxidation catalyst]
PM10	5.27	126.36	16.45	
VOC (tuning)	10.22	122.66	0.86	[<=== estimated max. VOC tons/tuning & commissioning.]
VOC	2.04	49.07	6.39	
SO2	2.71	65.10	8.48	

PROJECT EMISSIONS COMPARISONS: If trigger level comparison is > 0, then requirement is triggered.

Does project trigger permit threshold levels?

Pollutant	AQIA (lb/hr)	AQIA (lb/day)	AQIA (tons/yr)	BACT (lb/day)	Major Source (tons/yr)
NOx (tuning)	*54.97*	*709.66*	*-33.28*	*949.66*	*-43.28*
NOx (normal)	-9.01	133.86	9.98	373.86	-0.02
CO (tuning)	25.22	952.68	-89.48	NA	-239.48
CO (normal)	-89.27	-292.40	-66.46	NA	-216.46
PM10	--	26.36	1.45	116.36	-83.55
VOC (tuning)	NA	NA	NA	112.66	-49.14
VOC	NA	NA	NA	39.07	-43.61
SO2	-22.29	-184.90	-31.52	55.10	-91.52

*NOTE: CO and VOC normal operations estimate based on CO Ox-Cat target to meet ARB BACT Guidance for simple cycle gas turbines.

CHULA VISTA I: EXISTING GAS TURBINE EMISSION ESTIMATES AND
REGULATORY THRESHOLDS COMPARISON

CASE A	[CHULA VISTA I, GT1]		[CHULA VISTA II] GT2 (DLN, SCR, Ox-Cat)		
Assume:	44,000	kw	Turbine output	62,400	kw
	15,637	Btu/kW-hr	Heat rate	12,784	Btu/kW-hr
	20,610	Btu/lb	Heat content	20,610	Btu/lb
	33,383	lbs/hr	Fuel flow	38,706	lbs/hr
	1,000	Btu/scf	APCD NG Heat Value	1,000	Btu/scf
	688.0	MMBtu/hr	HHV	797.74	MMBtu/hr

NSR PERMIT THRESHOLDS

TRIGGER LEVELS: Rule 20.1, et. al relevant trigger levels for permitting.

Pollutant	AQIA (lb/hr)	AQIA (lb/day)	AQIA (tons/yr)	BACT (lb/day)	Major Source (tons/yr)
NOx	25	250	40	10	50
CO	100	550	100	NA	250
PM10	---	100	15	10	100
VOC	NA	NA	NA	10	50
SO2	25	250	40	10	100

CASE A: CONCURRENT NORMAL OPERATION of Chula Vista I, GT 1 and Chula Vista II, GT 2

CASE A(1) - Worse case of both turbines operate together all the time.

Normal Ops: **3,325** **hr/yr per GT** **24** **hours/day**

Pollutant	CV I (GT1) lb/hr	CV II (GT2) lb/hr	CV I and CV II lb/day	CV I and CV II tons/yr
NOx	14.07	15.99	721.57	49.98
CO	108.00	10.73	2,849.65	197.40
PM10	4.54	5.27	235.35	16.30
VOC	1.89	2.04	94.48	6.54
SO2	1.58	2.71	103.07	7.14

CASE A(2a) - One turbine operation, Chula Vista I (GT1)

GT1 **4,620** **hrs/year** **21** **hours/day**
GT2 **0** **hrs/year** **0** **hours/day**

Pollutant	lb/hr	lb/hr	lb/day	tons/yr
NOx	14.07	15.99	295.49	32.50
CO	108.00	10.73	2268.04	249.48
PM10	4.54	5.27	95.36	10.49
VOC	1.89	2.04	39.73	4.37
SO2	1.58	2.71	33.23	3.66

CASE A(2b) - One turbine operation, Chula Vista II (GT2)

GT1 **0** **hrs/year** **0** **hours/day**
GT2 **6,250** **hrs/year** **24** **hours/day**

Pollutant	lb/hr	lb/hr	lb/day	tons/yr
NOx	14.07	15.99	383.86	49.98
CO	108.00	10.73	257.60	33.54
PM10	4.54	5.27	126.36	16.45
VOC	1.89	2.04	49.07	6.39
SO2	1.58	2.71	65.10	8.48

CHULA VISTA I: EXISTING GAS TURBINE EMISSION ESTIMATES AND
REGULATORY THRESHOLDS COMPARISON

CASE B	[CHULA VISTA I, GT1]		[CHULA VISTA II] GT2 (DLN Only)		
Assume:	44,000	kw	Turbine output	58,000	kw
	15,637	Btu/kW-hr	Heat rate	12,784	Btu/kW-hr
	20,610	Btu/lb	Heat content	20,610	Btu/lb
	33,383	lbs/hr	Fuel flow	35,977	lbs/hr
	1,000	Btu/scf	APCD NG Heat Value	1,000	Btu/scf
	688.0	MMBtu/hr	HHV	741.49	MMBtu/hr

NSR PERMIT THRESHOLDS

TRIGGER LEVELS: Rule 20.1, et. al relevant trigger levels for permitting.

Pollutant	AQIA (lb/hr)	AQIA (lb/day)	AQIA (tons/yr)	BACT (lb/day)	Major Source (tons/yr)
NOx	25	250	40	10	50
CO	100	550	100	NA	250
PM10	---	100	15	10	100
VOC	NA	NA	NA	10	50
SO2	25	250	40	10	100

CASE A: CONCURRENT NORMAL OPERATION of Chula Vista I, GT 1 and Chula Vista II, GT 2

CASE B(1) - Worse case of both turbines operate together all the time.

Normal Ops: 1,130 **hr/yr per GT** 24 **hours/day**

Pollutant	CV I (GT 1) lb/hr	CV II [DLN] lb/hr	CV I and CV II lb/day	CV I and CV II tons/yr
NOx	14.07	74.33	2,121.69	49.95
CO	108.00	116.39	5,385.49	126.78
PM10	4.54	4.89	226.44	5.33
VOC	1.89	9.50	273.44	6.44
SO2	1.58	2.52	98.48	2.32

CASE B(2a) - One turbine operation, Chula Vista I (GT1)

GT1 4,620 **hrs/year** 21 **hours/day**
GT2 0 **hrs/year** 0 **hours/day**

Pollutant	lb/hr	lb/hr	lb/day	tons/yr
NOx	14.07	74.33	295.49	32.50
CO	108.00	116.39	2268.04	249.48
PM10	4.54	4.89	95.36	10.49
VOC	1.89	9.50	39.73	4.37
SO2	1.58	2.52	33.23	3.66

CASE B(2b) - One turbine operation, Chula Vista II (GT2)

GT1 0 **hrs/year** 0 **hours/day**
GT2 1,340 **hrs/year** 24 **hours/day**

Pollutant	lb/hr	lb/hr	lb/day	tons/yr
NOx	14.07	74.33	1783.99	49.80
CO	108.00	116.39	2793.44	77.98
PM10	4.54	4.89	117.45	3.28
VOC	1.89	9.50	228.03	6.37
SO2	1.58	2.52	60.51	1.69

CHULA VISTA I: EXISTING GAS TURBINE EMISSION ESTIMATES AND
REGULATORY THRESHOLDS COMPARISON

CASE C	[CHULA VISTA I, GT1]		[CHULA VISTA II] GT2 (DLN Only)		
Assume:	44,000	kw	Turbine output	58,000	kw
	15,637	Btu/kW-hr	Heat rate	12,784	Btu/kW-hr
	20,610	Btu/lb	Heat content	20,610	Btu/lb
	33,383	lbs/hr	Fuel flow	35,977	lbs/hr
	1,000	Btu/scf	APCD NG Heat Value	1,000	Btu/scf
	688.0	MMBtu/hr	HHV	741.49	MMBtu/hr

NSR PERMIT THRESHOLDS

TRIGGER LEVELS: Rule 20.1, et. al relevant trigger levels for permitting.

Pollutant	AQIA (lb/hr)	AQIA (lb/day)	AQIA (tons/yr)	BACT (lb/day)	Major Source (tons/yr)
NOx	25	250	40	10	50
CO	100	550	100	NA	250
PM10	---	100	15	10	100
VOC	NA	NA	NA	10	50
SO2	25	250	40	10	100

CASE C: CONCURRENT OPERATION of Chula Vista I, GT 1 and Chula Vista II, GT 2 (Variance)

CASE C(1) - Worse case of both turbines operate together all the time during variance period.

GT1	600	**hrs**	24	**hours/day**	*[<=== Hours assume concurrent with tuning CVII.]*
GT2 (var)	600	**hrs/tune**	12	**hours/day**	*[<=== Tuning; Chula Vista II, DLN Only.]*

Pollutant	CV I (GT 1) lb/hr	CV II [DLN] lb/hr	CV I and CV II lb/day	tons/yr	
NOx	14.07	148.67	2,121.69	48.82	*[<=== Tuning; Chula Vista II, DLN Only.]*
CO	108.00	332.55	6,582.68	132.17	*[<=== Tuning; Chula Vista II, DLN Only.]*
PM10	4.54	4.89	167.71	2.83	
VOC	1.89	9.50	159.43	3.42	
SO2	1.58	2.52	68.23	1.23	

CASE C(2a) - One turbine operation, Chula Vista I (GT1)

GT1	4,620	**hrs/year**	21	**hours/day**
GT2	0	**hrs/tune**	0	**hours/day**

Pollutant	lb/hr	lb/hr	lb/day	tons/yr
NOx	14.07	148.67	295.49	32.50
CO	108.00	332.55	2268.04	249.48
PM10	4.54	4.89	95.36	10.49
VOC	1.89	9.50	39.73	4.37
SO2	1.58	2.52	33.23	3.66

CASE C(2b) - One turbine operation, Chula Vista II (GT2, DLN Only - Variance Period)

GT1	0	**hrs/year**	0	**hours/day**	
GT2 (var)	600	**hrs/tune**	12	**hours/day**	*[<=== Tuning period for GT2, Phase 1.]*

Pollutant	lb/hr	lb/hr	lb/day	tons/yr
NOx	14.07	148.67	1783.99	44.60
CO	108.00	332.55	3990.63	99.77
PM10	4.54	4.89	58.73	1.47
VOC	1.89	9.50	114.02	2.85
SO2	1.58	2.52	30.25	0.76

AIR QUALITY
IMPACT ANALYSIS

Criteria Pollutants
Health Risk Assessment

AIR QUALITY MODELING IMPACTS SUMMARY
RAMCO, INC. – CHULA VISTA, CA

RAMCO, Inc. has completed air dispersion modeling for its proposed peak load electrical power plant in Chula Vista, California. The modeling supports the evaluation to determine whether the health risk analysis (HRA) associated with the emissions of toxic air contaminants from the turbines are in compliance with the requirements of SDAPCD Rule 1200 Toxic Air Contaminants – New Source Review. In addition, an Air Quality Impact Analyses (AQIA) for NOx, CO, and PM10 proposed criteria pollutant emissions increases were completed.

TURBINE STACK AND BUILDING PARAMETER DATA

Three turbine configurations were modeled to account for the operation of the turbines during different phases of the project. The three modeling configurations include:

1) Turbine 1 (existing permit)
   - Stack located to west of SCR unit for Turbine 1
   - Unit located in the southwestern corner of the facility property

2) Turbine 2 – Phase 1 (new turbine prior to SCR and oxidation catalyst (Ox-Cat))
   - Co-located stack above generator housing, no SCR unit
   - Unit located in the northwest corner of the facility property

3) Turbine 2 – Phase 2 (new turbine with SCR)
   - Stack located to west of SCR unit for Turbine 2
   - Unit located in the northwest corner of the facility property

The Turbine stack parameters are as follows:

Source Description	NAD27 UTM Easting (m)	NAD27 UTM Northing (m)	Release Height (ft)	Effective Stack Diameter (ft)	Gas Exit Temp (F)	Exhaust Airflow (acfm)	Exit Velocity (m/s)
Turbine 1	494552.1	3605783.6	40.00	19.67	789	1,054,400	17.6
Turbine 2 - Phase 1 (co-located stack)	494586.0	3605877.0	37.17	9.75	800	567,894	38.6
Turbine 2 - Phase 2	494541.5	3605877.0	40.00	22.38	818	1,179,078	15.2

Building downwash effects were considered in the analysis. Direction-specific downwash parameters were obtained using the BPIP model (Version 95086).

AIR QUALITY MODELING IMPACTS SUMMARY
RAMCO, INC. – CHULA VISTA, CA

TURBINE EMISSIONS

Turbine emission calculations are provided in the emissions description section of this report. As described, three general emissions scenarios were considered for the operation of the turbines during different phases of the project. The scenarios considered include:

Case A: Turbine 1 is equipped with DLN/SCR and Turbine 2 (Phase 2) is equipped with DLN/SCR and Ox-Cat; standard operations for both turbines

Case B: Turbine 1 is equipped with DLN/SCR and Turbine 2 (Phase 1) is equipped with DLN only; standard operations for both turbines

Case C: Turbine 1 is equipped with DLN/SCR and Turbine 2 is equipped with DLN only; standard operations for Turbine 1 and commissioning operations for Turbine 2

Each scenario case includes considerations of worst-case operations for the turbines operating concurrently and each individually. Commissioning periods for the installation of Turbine 2 (Phase 1) and retrofit of Turbine 2 (Phase 2) have been considered. Therefore, a total of nine scenarios were considered.

The San Diego Air Pollution Control District (SDAPCD) recently reviewed and approved the existing turbine (Turbine 1) permit application. Following the approved SDAPCD review, emissions calculations, health risk calculations, and AQIA calculations follow the SDAPCD approved methods used in the review of the existing turbine permit application.

AIR QUALITY MODELING

The ISCST3 model (Version 00101) was used to complete the air dispersion modeling. The ISCST3 model was run using the regulatory default and rural mode options. Terrain heights for fenceline, and hilltop receptors were obtained from USGS topographical maps. USGS Digital Elevation Model (DEM) data was used to determine receptor elevations at grid receptors. Elevations at each grid receptor were generated using interpolated 30-meter spaced DEM data. According to the SDAPCD review of the modeling for the existing turbine permit application, the receptor grid is sufficiently dense to identify maximum impacts. The same receptors were used for the modeling of Turbine 2 (new turbine). The coordinate system used in the analysis is the North American Datum 1927 (NAD27) coordinate system.

The Lindbergh Field – San Diego meteorological data for the years 1991, 1992 and 1993 were used in the model analysis. For consistency with the SDAPCD review of the Turbine 1 permit application, Lindbergh Field – San Diego meteorological data for the years 1996, 1997 and 1998 were used to consider the AQIA for PM10 only. All other health risk and AQIA calculations (for CO and NOx)

were performed using Lindbergh Field – San Diego meteorological data for the years 1991, 1992 and 1993.

HEALTH RISK ANALYSIS

SDAPCD - Rule 1200 requires that the emissions of toxic air contaminants (TAC) for each new or modified source not exceed specified health risk limits at all off-site receptor locations where the public may be exposed to the emissions. The locations of concern include residences, businesses, schools, day care centers, hospitals, government facilities, retirement homes or any location where public access is possible. Rule 1200 requires that the cancer risk and noncancer acute and chronic health hazard indices (HI) associated with the emissions are:

- Cancer Risk — less than or equal to 1 in a million
- Total acute noncancer HI — less than or equal to 1.0
- Total Chronic noncancer HI — less than or equal to 1.0.

As indicated above, the ISCST3 model was run with three sequential years of met data. As a result, the model output shows various averaging time concentrations over a three-year period at each receptor location. The maximum impact at any modeled receptor was used in the health risk calculations regardless of whether a person lives at the location or not (conservative approach).

Following SDAPCD approved methods, health risk calculations were performed for the three emissions scenarios previously discussed. The health risk modeling results are as follows:

Scenario [1]	Maximum		
	Cancer Risk	Chronic HI	Acute HI
Case A(1c)	3.0E-07	0.006	0.030
Case A(2a)	2.0E-07	0.004	0.015
Case A(2b)	2.9E-07	0.006	0.015
Case B(1c)	1.5E-07	0.003	0.040
Case B(2a)	2.0E-07	0.004	0.015
Case B(2b)	1.0E-07	0.002	0.025
Case C(1c)	7.2E-08	0.001	0.040
Case C(2a)	2.0E-07	0.004	0.015
Case C(2b)	4.5E-08	0.001	0.025

[1] Cases A(1c), B(1c), and C(1c) consider worst-case concurrent operations (both turbines operating at same time);
Cases A(2a), B(2a), and C(2a) consider only Turbine 1 worst-case operations;
Cases A(2b), B(2b), and C(2b) consider only Turbine 2 worst-case operations
**See emissions description section for more details

The maximum health risk values for all operating scenarios are all less than the Rule 1200 requirements of a cancer risk less than 1 in one million and a noncancer chronic and acute HI of less than 1.0.

During normal operations, maximum ammonia slip from both Turbine 1 and Turbine 2 will not exceed 10 ppm. However, during SCR tuning associated with commissioning Turbine 1, and retrofitting Turbine 2 with an SCR, ammonia slip may be as high as 40 ppm for brief periods. The higher ammonia emissions would affect only maximum acute risk impacts. Due to the brevity of higher ammonia emissions, the increase in maximum chronic risk impacts would be negligible. Since maximum acute risk values (assuming 10 ppm slip) are more than 25 times less than the 1.0 acute risk standard, higher ammonia emissions during commissioning will not change the health risk assessment conclusions.

AIR QUALITY IMPACT ANALYSIS

The purpose of this evaluation is to determine whether air quality impacts from proposed criteria pollutant emissions increases will cause or contribute to a violation of any air quality standard, or worsen an existing air quality problem. Applicable standards include the California Ambient Air Quality Standards (CAAQS) and the National Ambient Air Quality Standards (NAAQS).

SDAPCD - Rule 20.2 requires the applicant to compare expected emissions increases of criteria pollutants to AQIA trigger levels set forth in Table 20.2-1 of the rule. The trigger levels are:

	Emissions Level		
Air Contaminant	(lb/hr)	(lb/day)	(tons/yr)
Particulate Matter (PM10)	---	100	15
Oxides of Nitrogen (NOx)	25	250	40
Oxides of Sulfur (SOx)	25	250	40
Carbon Monoxide (CO)	100	550	100
Lead and Lead Compounds	---	3.2	0.6

An AQIA modeling study was performed for NOx, CO, and PM10 for all three emissions cases (9 scenarios total) described above. Total impacts, or the maximum modeled concentrations plus background, were compared to CAAQS and NAAQS values.

As indicated above the ISCST3 model was run with three sequential years of met data. For consistency with the SDAPCD review of the existing permit application, Lindbergh Field – San Diego meteorological data for the years 1996, 1997 and 1998 were used to consider the AQIA for PM10

only. All other AQIA calculations (for CO and NOx) were performed using Lindbergh Field – San Diego meteorological data for the years 1991, 1992 and 1993. As a result, the model output shows various averaging time concentrations over a three-year period at each receptor location. The maximum impact at any modeled receptor was used in the AQIA analyses.

Following the SDAPCD approach used for the review of the existing permit, an AQIA analysis was performed. Background values used are consistent with those provided by SDAPCD in the approved review of the existing permit. The air quality modeling results for emissions scenarios are attached at the end of this section.

All total impacts (maximum modeled concentrations plus background) are below the California and National Ambient Air Quality Standards. Therefore, the proposed project would not be expected to cause or contribute to an exceedance of any air quality standard.

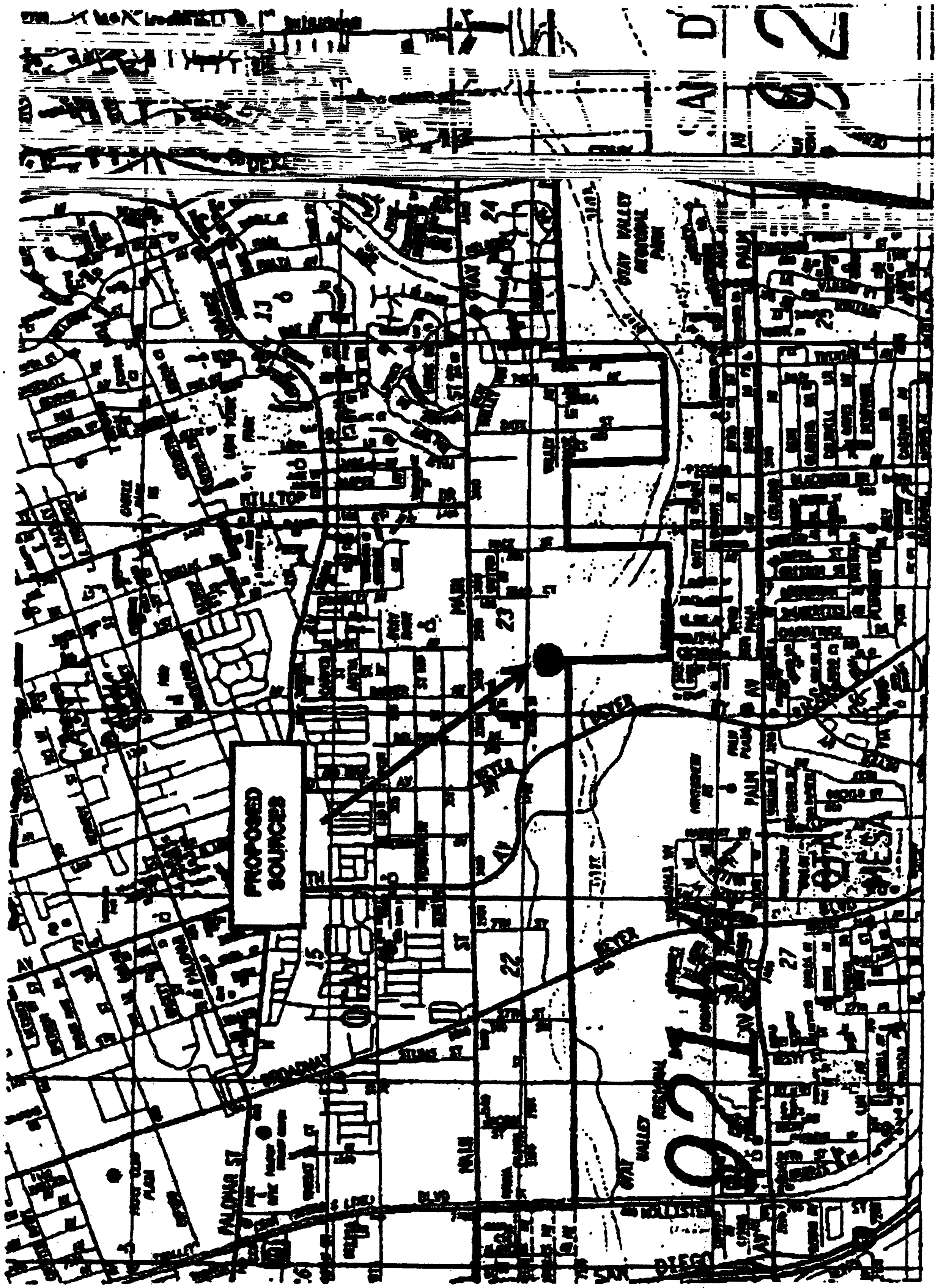

FIGURE 1a.

RAMCO - Chula Vista, CA
NOx AQIA Summary

Maximum 1-hour NO_2 Concentration						
	NO_2 1-hour Concentration (mg/m^3)			NO_2 1-Hour Standard (mg/m^3)		Exceed
Scenario [1]	Max. Modeled	Background	Total	California	Federal	Standard?
Case A(1c)	13.26	207.0	220.3	470	None	NO
Case A(2a)	6.69	207.0	213.7	470	None	NO
Case A(2b)	6.57	207.0	213.6	470	None	NO
Case B(1c)	67.01	207.0	274.0	470	None	NO
Case B(2a)	6.69	207.0	213.7	470	None	NO
Case B(2b)	60.32	207.0	267.3	470	None	NO
Case C(1c)	127.33	207.0	334.3	470	None	NO
Case C(2a)	6.69	207.0	213.7	470	None	NO
Case C(2b)	120.65	207.0	327.6	470	None	NO

Annual Average NO_2 Concentration						
	NO_2 Annual Concentration (mg/m^3)			NO_2 Annual Standard (mg/m^3)		Exceed
Scenario [1]	Max. Modeled	Background	Total	California	Federal	Standard?
Case A(1c)	0.15	36.0	36.1	None	100	NO
Case A(2a)	0.14	36.0	36.1	None	100	NO
Case A(2b)	0.13	36.0	36.1	None	100	NO
Case B(1c)	0.23	36.0	36.2	None	100	NO
Case B(2a)	0.10	36.0	36.1	None	100	NO
Case B(2b)	0.24	36.0	36.2	None	100	NO
Case C(1c)	0.23	36.0	36.2	None	100	NO
Case C(2a)	0.10	36.0	36.1	None	100	NO
Case C(2b)	0.22	36.0	36.2	None	100	NO

-- Background data is from SDAPCD review for approved existing permit Chula Vista Station 1996-1998

[1] Case A(1c) considers worst-case concurrent operations (both turbines operating at same time);
Case A(2a) considers only Turbine 1 worst-case operations;
Case A(2b) considers only Turbine 2 worst-case operations

**See emissions description section for more details

RAMCO - Chula Vista, CA
CO AQIA Summary

Maximum 1-hour CO Concentration

Scenario [1]	CO 1-hour Concentration (mg/m^3)			CO 1-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background	Total	California	Federal	
Case A(1c)	0.06	6.1	6.2	23	40	NO
Case A(2a)	0.05	6.1	6.2	23	40	NO
Case A(2b)	0.004	6.1	6.1	23	40	NO
Case B(1c)	0.15	6.1	6.2	23	40	NO
Case B(2a)	0.05	6.1	6.2	23	40	NO
Case B(2b)	0.09	6.1	6.2	23	40	NO
Case C(1c)	0.32	6.1	6.4	23	40	NO
Case C(2a)	0.05	6.1	6.2	23	40	NO
Case C(2b)	0.27	6.1	6.4	23	40	NO

Maximum 8-hour CO Concentration

Scenario [1]	CO 8-hour Concentration (mg/m^3)			CO 8-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background	Total	California	Federal	
Case A(1c)	0.03	4.0	4.0	10	10	NO
Case A(2a)	0.03	4.0	4.0	10	10	NO
Case A(2b)	0.003	4.0	4.0	10	10	NO
Case B(1c)	0.08	4.0	4.1	10	10	NO
Case B(2a)	0.03	4.0	4.0	10	10	NO
Case B(2b)	0.05	4.0	4.1	10	10	NO
Case C(1c)	0.18	4.0	4.2	10	10	NO
Case C(2a)	0.03	4.0	4.0	10	10	NO
Case C(2b)	0.15	4.0	4.2	10	10	NO

-- Background data is from SDAPCD review for approved existing permit Chula Vista Station 1996-1998

[1] Case A(1c) considers worst-case concurrent operations (both turbines operating at same time);
Case A(2a) considers only Turbine 1 worst-case operations;
Case A(2b) considers only Turbine 2 worst-case operations

**See emissions description section for more details

RAMCO - Chula Vista, CA
PM10 AQIA Summary

Maximum 24-hour PM_{10} Concentration

Scenario [1]	PM_{10} 24-hour Concentration ($\mu g/m^3$)			PM_{10} 24-Hour Standard ($\mu g/m^3$)		Exceed Standard?
	Max. Modeled	Background	Total	California	Federal	
Case A(1c)	1.26	48.0	49.3	50	150	NO
Case A(2a)	0.54	48.0	48.5	50	150	NO
Case A(2b)	0.65	48.0	48.6	50	150	NO
Case B(1c)	1.72	48.0	49.7	50	150	NO
Case B(2a)	0.54	48.0	48.5	50	150	NO
Case B(2b)	1.11	48.0	49.1	50	150	NO
Case C(1c)	1.17	48.0	49.2	50	150	NO
Case C(2a)	0.54	48.0	48.5	50	150	NO
Case C(2b)	0.55	48.0	48.6	50	150	NO

Annual Average Geometric PM_{10} Concentration

Scenario [1]	PM_{10} Annual Concentration ($\mu g/m^3$)			PM_{10} Annual Standard ($\mu g/m^3$)		Exceed Standard?
	Max. Modeled	Background	Total	California	Federal	
Case A(1c)	0.06	27.0	27.1	30	None	NO
Case A(2a)	0.04	27.0	27.0	30	None	NO
Case A(2b)	0.05	27.0	27.1	30	None	NO
Case B(1c)	0.02	27.0	27.0	30	None	NO
Case B(2a)	0.04	27.0	27.0	30	None	NO
Case B(2b)	0.02	27.0	27.0	30	None	NO
Case C(1c)	0.01	27.0	27.0	30	None	NO
Case C(2a)	0.04	27.0	27.0	30	None	NO
Case C(2b)	0.01	27.0	27.0	30	None	NO

Annual Average Arithmetic PM_{10} Concentration

Scenario [1]	PM_{10} Annual Concentration ($\mu g/m^3$)			PM_{10} Annual Standard ($\mu g/m^3$)		Exceed Standard?
	Max. Modeled	Background	Total	California	Federal	
Case A(1c)	0.06	28.0	28.1	None	50	NO
Case A(2a)	0.04	28.0	28.0	None	50	NO
Case A(2b)	0.05	28.0	28.1	None	50	NO
Case B(1c)	0.02	28.0	28.0	None	50	NO
Case B(2a)	0.04	28.0	28.0	None	50	NO
Case B(2b)	0.02	28.0	28.0	None	50	NO
Case C(1c)	0.01	28.0	28.0	None	50	NO
Case C(2a)	0.04	28.0	28.0	None	50	NO
Case C(2b)	0.01	28.0	28.0	None	50	NO

-- Background data is from SDAPCD review for approved existing permit Chula Vista Station 1996-1998

[1] Case A(1c) considers worst-case concurrent operations (both turbines operating at same time);
Case A(2a) considers only Turbine 1 worst-case operations;
Case A(2b) considers only Turbine 2 worst-case operations

**See emissions description section for more details

CASE A: AQIA CALCULATIONS

RAMCO - Chula Vista, CA

Case A(1a) - AQIA for Standard Operation Emissions - Turbine 1 With SCR Controls

9-May-01

Max Operating Hours Per Day	Max Operating Hours Per Year
24	3,325

NOx Emissions (5 ppm)				*CO Emissions (70 ppm)*		*PM_{10} Emissions*			
Max. 1-Hour NOx Emissions		Annual Average NOx Emissions		Max. 1-hour CO Emissions		Max. 24-Hour PM_{10} Emissions		Annual Average PM_{10} Emissions	
(lb/hr)	(g/sec)	(tons/yr)	(g/sec)	(lb/hr)	(g/s)	(lb/day)	(g/sec)	(tons/yr)	(g/sec)
14.07	1.77	23.4	0.67	108.0	13.61	109.0	0.57	7.5	0.22

Maximum 1-hour NO_2 Concentration

Max. 1-hr X/Q [1]	Max. Modeled NOx 1-hr Conc. ($\mu g/m^3$)	NO_2 1-hour Concentration ($\mu g/m^3$)			NO_2 1-Hour Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2a]	Background [3]	Total	California	Federal	
3.77	6.69	6.69	207.0	213.7	470	None	NO

Annual Average NO_2 Concentration

Ann. Avg. X/Q [1]	Max. Modeled NOx Ann. Conc. ($\mu g/m^3$)	NO_2 Annual Concentration ($\mu g/m^3$)			NO_2 Annual Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2b]	Background [4]	Total	California	Federal	
0.14	0.10	0.07	36.0	36.1	None	100	NO

[1] Obtained from ISCST3 modeling

[2a] Assumes NOx = NO_2

[2b] Default ambient NO_2/NOx ratio of 0.75 used

[3] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[4] Max. annual value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 1-hour CO Concentration

Max. 1-hr X/Q [1]	CO 1-hour Concentration (mg/m^3)			CO 1-hour Standard (mg/m		Exceed Standard?
	Max. Modeled	Background [2]	Total	California	Federal	
3.77	0.05	6.1	6.2	23	40	NO

Maximum 8-hour CO Concentration

Max. 8-hr X/Q [1]	CO 8-hour Concentration (mg/m^3)			CO 8-hour Standard (mg/m		Exceed Standard?
	Max. Modeled	Background [3]	Total	California	Federal	
2.32	0.03	4.0	4.0	10	10	NO

[1] Obtained from ISCST3 modeling

[2] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Max. 8-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 24-hour PM_{10} Concentration

Max. 24-hr X/Q [1]	PM_{10} 24-hour Concentration (µg/m³)			PM_{10} 24-Hour Standard (µg/m		Exceed
	Max. Modeled	Background [2]	Total	California	Federal	Standard?
1.08	0.62	48.0	48.6	50	150	NO

Annual Average Geometric PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m³)			PM_{10} Annual Standard (µg/m		Exceed
	Max. Modeled [3]	Background [4]	Total	California	Federal	Standard?
0.13	0.03	27.0	27.0	30	---	NO

Annual Average Arithmetic PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m³)			PM_{10} Annual Standard (µg/m		Exceed
	Max. Modeled	Background [4]	Total	California	Federal	Standard?
0.13	0.03	28.0	28.0	---	50	NO

[1] Obtained from ISCST3 modeling

[2] Max. 24-hour value not exceeding the 50µg/m³ standard at the Chula Vista station 1996-1998; provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Arithmetic average

[4] Provided in 01/20/01 initial modeling review memo from SDAPCD

* Lindbergh Field meteorological data (1996-1998) used for PM10 modeling

RAMCO - Chula Vista, CA

Case A(1b) - AQIA for Standard Operation Emissions - Turbine 2 - Phase 2 - With SCR / Ox-Cat Controls

9-May-01

Max Operating Hours Per Day	Max Operating Hours Per Year
24	3,325

NOx Emissions (5 ppm)				*CO Emissions (6 ppm)*		*PM_{10} Emissions*			
Max. 1-Hour NOx Emissions		**Annual Average NOx Emissions**		**Max. 1-hour CO Emissions**		**Max. 24-Hour PM_{10} Emissions**		**Annual Average PM_{10} Emissions**	
(lb/hr)	**(g/sec)**	**(tons/yr)**	**(g/sec)**	**(lb/hr)**	**(g/s)**	**(lb/day)**	**(g/sec)**	**(tons/yr)**	**(g/sec)**
15.99	2.02	26.6	0.76	10.73	1.35	126.4	0.66	8.8	0.25

Maximum 1-hour NO_2 Concentration

Max. 1-hr X/Q [1]	Max. Modeled NOx 1-hr Conc. ($\mu g/m^3$)	NO_2 1-hour Concentration ($\mu g/m^3$)			NO_2 1-Hour Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2a]	Background [3]	Total	California	Federal	
3.26	6.57	6.57	207.0	213.6	470	None	NO

Annual Average NO_2 Concentration

Ann. Avg. X/Q [1]	Max. Modeled NOx Ann. Conc. ($\mu g/m^3$)	NO_2 Annual Concentration ($\mu g/m^3$)			NO_2 Annual Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2b]	Background [4]	Total	California	Federal	
0.13	0.10	0.07	36.0	36.1	None	100	NO

[1] Obtained from ISCST3 modeling

[2a] Assumes NOx = NO_2

[2b] Default ambient NO_2/NOx ratio of 0.75 used

[3] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[4] Max. annual value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 1-hour CO Concentration

Max. 1-hr X/Q [1]	CO 1-hour Concentration (mg/m^3)			CO 1-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background [2]	Total	California	Federal	
3.26	0.004	6.1	6.1	23	40	NO

Maximum 8-hour CO Concentration

Max. 8-hr X/Q [1]	CO 8-hour Concentration (mg/m^3)			CO 8-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background [3]	Total	California	Federal	
2.09	0.003	4.0	4.0	10	10	NO

[1] Obtained from ISCST3 modeling

[2] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Max. 8-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 24-hour PM_{10} Concentration

Max. 24-hr X/Q [1]	PM_{10} 24-hour Concentration (µg/m³)			PM_{10} 24-Hour Standard (µg/m		Exceed Standard?
	Max. Modeled	Background[2]	Total	California	Federal	
0.97	0.65	48.0	48.6	50	150	NO

Annual Average Geometric PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m³)			PM_{10} Annual Standard (µg/m		Exceed Standard?
	Max. Modeled [3]	Background[4]	Total	California	Federal	
0.11	0.03	27.0	27.0	30	---	NO

Annual Average Arithmetic PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m³)			PM_{10} Annual Standard (µg/m		Exceed Standard?
	Max. Modeled	Background[4]	Total	California	Federal	
0.11	0.03	28.0	28.0	---	50	NO

[1] Obtained from ISCST3 modeling

[2] Max. 24-hour value not exceeding the 50µg/m³ standard at the Chula Vista station 1996-1998; provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Arithmetic average

[4] Provided in 01/20/01 initial modeling review memo from SDAPCD

* Lindbergh Field meteorological data (1996-1998) used for PM10 modeling

RAMCO - Chula Vista, CA

Case A(1c) - AQIA Summary - Combination of Turbine Impacts

Final Project Standard Operations (Turbine 1 with SCR and Turbine 2 - Phase 2 With SCR / Ox-Cat Concurrent Operations)

9-May-01

Max Operating Hours Per Day	Max Operating Hours Per Year
24	3,325

Maximum 1-hour NO_2 Concentration

NO_2 1-hour Concentration ($\mu g/m^3$)			NO_2 1-Hour Standard ($\mu g/m$		Exceed
Max. Modeled [1]	Background [3]	Total	California	Federal	Standard?
13.26	207.0	220.3	470	None	NO

Annual Average NO_2 Concentration

NO_2 Annual Concentration ($\mu g/m^3$)			NO_2 Annual Standard ($\mu g/m$		Exceed
Max. Modeled [2]	Background [4]	Total	California	Federal	Standard?
0.15	36.0	36.1	None	100	NO

[1] Assumes NOx = NO_2

[2] Default ambient NO_2/NOx ratio of 0.75 used

[3] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[4] Max. annual value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 1-hour CO Concentration

CO 1-hour Concentration (mg/m^3)			CO 1-hour Standard (mg		Exceed
Max. Modeled	Background [1]	Total	California	Federal	Standard?
0.06	6.1	6.2	23	40	NO

Maximum 8-hour CO Concentration

CO 8-hour Concentration (mg/m^3)			CO 8-hour Standard (mg		Exceed
Max. Modeled	Background [2]	Total	California	Federal	Standard?
0.03	4.0	4.0	10	10	NO

[1] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[2] Max. 8-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 24-hour PM_{10} Concentration

PM_{10} 24-hour Concentration ($\mu g/m^3$)			PM_{10} 24-Hour Standard (μg		Exceed
Max. Modeled	Background [1]	Total	California	Federal	Standard?
1.26	48.0	49.3	50	150	NO

Annual Average Geometric PM_{10} Concentration

PM_{10} Annual Concentration ($\mu g/m^3$)			PM_{10} Annual Standard (μg		Exceed
Max. Modeled [2]	Background [3]	Total	California	Federal	Standard?
0.06	27.0	27.1	30	---	NO

Annual Average Arithmetic PM_{10} Concentration

PM_{10} Annual Concentration ($\mu g/m^3$)			PM_{10} Annual Standard (μg		Exceed
Max. Modeled	Background [3]	Total	California	Federal	Standard?
0.06	28.0	28.1	---	50	NO

[1] Max. 24-hour value not exceeding the 50 $\mu g/m^3$ standard at the Chula Vista station 1996-1998; provided in 01/20/01 initial modeling review memo from SDAPCD

[2] Arithmetic average

[3] Provided in 01/20/01 initial modeling review memo from SDAPCD

* Lindbergh Field meteorological data (1996-1998) used for PM10 modeling

RAMCO - Chula Vista, CA

Case A(2a) - AQIA for Standard Operation Emissions - Turbine 1 With SCR Controls

9-May-01

Max Operating Hours Per Day	Max Operating Hours Per Year
21	4,620

NOx Emissions (5 ppm)				*CO Emissions (70 ppm)*		*PM_{10} Emissions*			
Max. 1-Hour NOx Emissions		Annual Average NOx Emissions		Max. 1-hour CO Emissions		Max. 24-Hour PM_{10} Emissions		Annual Average PM_{10} Emissions	
(lb/hr)	(g/sec)	(tons/yr)	(g/sec)	(lb/hr)	(g/s)	(lb/day)	(g/sec)	(tons/yr)	(g/sec)
14.07	1.77	32.5	0.94	108.0	13.61	95.4	0.50	10.5	0.30

Maximum 1-hour NO_2 Concentration

Max. 1-hr X/Q [1]	Max. Modeled NOx 1-hr Conc. ($\mu g/m^3$)	NO_2 1-hour Concentration ($\mu g/m^3$)			NO_2 1-Hour Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2a]	Background [3]	Total	California	Federal	
3.77	6.69	6.69	207.0	213.7	470	None	NO

Annual Average NO_2 Concentration

Ann. Avg. X/Q [1]	Max. Modeled NOx Ann. Conc. ($\mu g/m^3$)	NO_2 Annual Concentration ($\mu g/m^3$)			NO_2 Annual Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2b]	Background [4]	Total	California	Federal	
0.14	0.13	0.10	36.0	36.1	None	100	NO

[1] Obtained from ISCST3 modeling

[2a] Assumes NOx = NO_2

[2b] Default ambient NO_2/NOx ratio of 0.75 used

[3] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[4] Max. annual value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 1-hour CO Concentration

Max. 1-hr X/Q [1]	CO 1-hour Concentration (mg/m^3)			CO 1-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background [2]	Total	California	Federal	
3.77	0.05	6.1	6.2	23	40	NO

Maximum 8-hour CO Concentration

Max. 8-hr X/Q [1]	CO 8-hour Concentration (mg/m^3)			CO 8-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background [3]	Total	California	Federal	
2.32	0.03	4.0	4.0	10	10	NO

[1] Obtained from ISCST3 modeling

[2] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Max. 8-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 24-hour PM_{10} Concentration

Max. 24-hr X/Q [1]	PM_{10} 24-hour Concentration (µg/m³)			PM_{10} 24-Hour Standard (µg/m		Exceed Standard?
	Max. Modeled	Background [2]	Total	California	Federal	
1.08	0.54	48.0	48.5	50	150	NO

Annual Average Geometric PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m³)			PM_{10} Annual Standard (µg/m		Exceed Standard?
	Max. Modeled [3]	Background [4]	Total	California	Federal	
0.13	0.04	27.0	27.0	30	---	NO

Annual Average Arithmetic PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m³)			PM_{10} Annual Standard (µg/m		Exceed Standard?
	Max. Modeled	Background [4]	Total	California	Federal	
0.13	0.04	28.0	28.0	---	50	NO

[1] Obtained from ISCST3 modeling

[2] Max. 24-hour value not exceeding the 50µg/m³ standard at the Chula Vista station 1996-1998; provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Arithmetic average

[4] Provided in 01/20/01 initial modeling review memo from SDAPCD

* Lindbergh Field meteorological data (1996-1998) used for PM10 modeling

RAMCO - Chula Vista, CA

Case A(2b) - AQIA for Standard Operation Emissions - Turbine 2 - Phase 2 - With SCR / Ox-Cat Controls

9-May-01

Max Operating Hours Per Day	Max Operating Hours Per Year
24	6,250

NOx Emissions (5 ppm)				*CO Emissions (6 ppm)*		*PM_{10} Emissions*			
Max. 1-Hour NOx Emissions		Annual Average NOx Emissions		Max. 1-hour CO Emissions		Max. 24-Hour PM_{10} Emissions		Annual Average PM_{10} Emissions	
(lb/hr)	(g/sec)	(tons/yr)	(g/sec)	(lb/hr)	(g/s)	(lb/day)	(g/sec)	(tons/yr)	(g/sec)
15.99	2.02	50.0	1.44	10.73	1.35	126.4	0.66	16.5	0.47

Maximum 1-hour NO_2 Concentration

Max. 1-hr X/Q [1]	Max. Modeled NOx 1-hr Conc. ($\mu g/m^3$)	NO_2 1-hour Concentration ($\mu g/m^3$)			NO_2 1-Hour Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2a]	Background [3]	Total	California	Federal	
3.26	6.57	6.57	207.0	213.6	470	None	NO

Annual Average NO_2 Concentration

Ann. Avg. X/Q [1]	Max. Modeled NOx Ann. Conc. ($\mu g/m^3$)	NO_2 Annual Concentration ($\mu g/m^3$)			NO_2 Annual Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2b]	Background [4]	Total	California	Federal	
0.13	0.19	0.14	36.0	36.1	None	100	NO

[1] Obtained from ISCST3 modeling

[2a] Assumes NOx = NO_2

[2b] Default ambient NO_2/NOx ratio of 0.75 used

[3] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[4] Max. annual value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 1-hour CO Concentration

Max. 1-hr X/Q [1]	CO 1-hour Concentration (mg/m^3)			CO 1-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background [2]	Total	California	Federal	
3.26	0.004	6.1	6.1	23	40	NO

Maximum 8-hour CO Concentration

Max. 8-hr X/Q [1]	CO 8-hour Concentration (mg/m^3)			CO 8-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background [3]	Total	California	Federal	
2.09	0.003	4.0	4.0	10	10	NO

[1] Obtained from ISCST3 modeling

[2] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Max. 8-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 24-hour PM_{10} Concentration

Max. 24-hr X/Q [1]	PM_{10} 24-hour Concentration (µg/m³)			PM_{10} 24-Hour Standard (µg/m		Exceed Standard?
	Max. Modeled	Background[2]	Total	California	Federal	
0.97	0.65	48.0	48.6	50	150	NO

Annual Average Geometric PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m³)			PM_{10} Annual Standard (µg/m		Exceed Standard?
	Max. Modeled [3]	Background[4]	Total	California	Federal	
0.11	0.05	27.0	27.1	30	---	NO

Annual Average Arithmetic PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m³)			PM_{10} Annual Standard (µg/m		Exceed Standard?
	Max. Modeled	Background[4]	Total	California	Federal	
0.11	0.05	28.0	28.1	---	50	NO

[1] Obtained from ISCST3 modeling

[2] Max. 24-hour value not exceeding the 50µg/m³ standard at the Chula Vista station 1996-1998; provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Arithmetic average

[4] Provided in 01/20/01 initial modeling review memo from SDAPCD

* Lindbergh Field meteorological data (1996-1998) used for PM10 modeling

CASE B: AQIA CALCULATIONS

RAMCO - Chula Vista, CA

Case B(1a) - AQIA for Standard Operation Emissions - Turbine 1 With SCR Controls

9-May-01

Max Operating Hours Per Day	Max Operating Hours Per Year
24	1,130

NOx Emissions (5 ppm)				*CO Emissions (70 ppm)*		*PM_{10} Emissions*			
Max. 1-Hour NOx Emissions		Annual Average NOx Emissions		Max. 1-hour CO Emissions		Max. 24-Hour PM_{10} Emissions		Annual Average PM_{10} Emissions	
(lb/hr)	(g/sec)	(tons/yr)	(g/sec)	(lb/hr)	(g/s)	(lb/day)	(g/sec)	(tons/yr)	(g/sec)
14.07	1.77	8.0	0.23	108.0	13.61	109.0	0.57	2.6	0.07

Maximum 1-hour NO_2 Concentration

Max. 1-hr X/Q [1]	Max. Modeled NOx 1-hr Conc. ($\mu g/m^3$)	NO_2 1-hour Concentration ($\mu g/m^3$)			NO_2 1-Hour Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2a]	Background [3]	Total	California	Federal	
3.77	6.69	6.69	207.0	213.7	470	None	NO

Annual Average NO_2 Concentration

Ann. Avg. X/Q [1]	Max. Modeled NOx Ann. Conc. ($\mu g/m^3$)	NO_2 Annual Concentration ($\mu g/m^3$)			NO_2 Annual Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2b]	Background [4]	Total	California	Federal	
0.14	0.03	0.02	36.0	36.0	None	100	NO

[1] Obtained from ISCST3 modeling

[2a] Assumes NOx = NO_2

[2b] Default ambient NO_2/NOx ratio of 0.75 used

[3] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[4] Max. annual value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 1-hour CO Concentration

Max. 1-hr X/Q [1]	CO 1-hour Concentration (mg/m^3)			CO 1-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background [2]	Total	California	Federal	
3.77	0.05	6.1	6.2	23	40	NO

Maximum 8-hour CO Concentration

Max. 8-hr X/Q [1]	CO 8-hour Concentration (mg/m^3)			CO 8-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background [3]	Total	California	Federal	
2.32	0.03	4.0	4.0	10	10	NO

[1] Obtained from ISCST3 modeling

[2] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Max. 8-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 24-hour PM_{10} Concentration

Max. 24-hr X/Q [1]	PM_{10} 24-hour Concentration (µg/m³)			PM_{10} 24-Hour Standard (µg/m		Exceed Standard?
	Max. Modeled	Background [2]	Total	California	Federal	
1.08	0.62	48.0	48.6	50	150	NO

Annual Average Geometric PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m³)			PM_{10} Annual Standard (µg/m		Exceed Standard?
	Max. Modeled [3]	Background [4]	Total	California	Federal	
0.13	0.01	27.0	27.0	30	---	NO

Annual Average Arithmetic PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m³)			PM_{10} Annual Standard (µg/m		Exceed Standard?
	Max. Modeled	Background [4]	Total	California	Federal	
0.13	0.01	28.0	28.0	---	50	NO

[1] Obtained from ISCST3 modeling

[2] Max. 24-hour value not exceeding the 50µg/m³ standard at the Chula Vista station 1996-1998; provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Arithmetic average

[4] Provided in 01/20/01 initial modeling review memo from SDAPCD

* Lindbergh Field meteorological data (1996-1998) used for PM10 modeling

RAMCO - Chula Vista, CA

Case B(1b) - AQIA for Standard Operation Emissions - Turbine 2 - Phase 1 - No SCR / Ox-Cat Controls

9-May-01

Max Operating Hours Per Day	Max Operating Hours Per Year
24	1,130

NOx Emissions (25 ppm)				*CO Emissions (70 ppm)*		*PM_{10} Emissions*			
Max. 1-Hour NOx Emissions		Annual Average NOx Emissions		Max. 1-hour CO Emissions		Max. 24-Hour PM_{10} Emissions		Annual Average PM_{10} Emissions	
(lb/hr)	(g/sec)	(tons/yr)	(g/sec)	(lb/hr)	(g/s)	(lb/day)	(g/sec)	(tons/yr)	(g/sec)
74.33	9.37	42.0	1.21	116.4	14.67	117.5	0.62	2.8	0.08

Maximum 1-hour NO_2 Concentration

Max. 1-hr X/Q [1]	Max. Modeled NOx 1-hr Conc. ($\mu g/m^3$)	NO_2 1-hour Concentration ($\mu g/m^3$)			NO_2 1-Hour Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2a]	Background [3]	Total	California	Federal	
6.44	60.32	60.32	207.0	267.3	470	None	NO

Annual Average NO_2 Concentration

Ann. Avg. X/Q [1]	Max. Modeled NOx Ann. Conc. ($\mu g/m^3$)	NO_2 Annual Concentration ($\mu g/m^3$)			NO_2 Annual Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2b]	Background [4]	Total	California	Federal	
0.22	0.27	0.20	36.0	36.2	None	100	NO

[1] Obtained from ISCST3 modeling

[2a] Assumes NOx = NO_2

[2b] Default ambient NO_2/NOx ratio of 0.75 used

[3] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[4] Max. annual value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 1-hour CO Concentration

Max. 1-hr X/Q [1]	CO 1-hour Concentration (mg/m^3)			CO 1-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background [2]	Total	California	Federal	
6.44	0.09	6.1	6.2	23	40	NO

Maximum 8-hour CO Concentration

Max. 8-hr X/Q [1]	CO 8-hour Concentration (mg/m^3)			CO 8-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background [3]	Total	California	Federal	
3.61	0.05	4.0	4.1	10	10	NO

[1] Obtained from ISCST3 modeling

[2] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Max. 8-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 24-hour PM_{10} Concentration

Max. 24-hr X/Q [1]	PM_{10} 24-hour Concentration (µg/m³)			PM_{10} 24-Hour Standard (µg/m		Exceed Standard?
	Max. Modeled	Background[2]	Total	California	Federal	
1.79	1.11	48.0	49.1	50	150	NO

Annual Average Geometric PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m³)			PM_{10} Annual Standard (µg/m		Exceed Standard?
	Max. Modeled [3]	Background[4]	Total	California	Federal	
0.20	0.02	27.0	27.0	30	---	NO

Annual Average Arithmetic PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m³)			PM_{10} Annual Standard (µg/m		Exceed Standard?
	Max. Modeled	Background[4]	Total	California	Federal	
0.20	0.02	28.0	28.0	---	50	NO

[1] Obtained from ISCST3 modeling

[2] Max. 24-hour value not exceeding the 50µg/m³ standard at the Chula Vista station 1996-1998; provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Arithmetic average

[4] Provided in 01/20/01 initial modeling review memo from SDAPCD

* Lindbergh Field meteorological data (1996-1998) used for PM10 modeling

RAMCO - Chula Vista, CA

Case B(1c) - AQIA Summary - Combination of Turbine Impacts

Final Project Standard Operations (Turbine 1 With SCR and Turbine 2 - Phase 2 No SCR / Ox-Cat Concurrent Operations)

9-May-01

Max Operating Hours Per Day	Max Operating Hours Per Year
24	1,130

Maximum 1-hour NO_2 Concentration

NO_2 1-hour Concentration ($\mu g/m^3$)			NO_2 1-Hour Standard ($\mu g/m$		Exceed
Max. Modeled [1]	Background [3]	Total	California	Federal	Standard?
67.01	207.0	274.0	470	None	NO

Annual Average NO_2 Concentration

NO_2 Annual Concentration ($\mu g/m^3$)			NO_2 Annual Standard ($\mu g/$		Exceed
Max. Modeled [2]	Background [4]	Total	California	Federal	Standard?
0.23	36.0	36.2	None	100	NO

[1] Assumes NOx = NO_2

[2] Default ambient NO_2/NOx ratio of 0.75 used

[3] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[4] Max. annual value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 1-hour CO Concentration

CO 1-hour Concentration (mg/m^3)			CO 1-hour Standard (mg		Exceed
Max. Modeled	Background [1]	Total	California	Federal	Standard?
0.15	6.1	6.2	23	40	NO

Maximum 8-hour CO Concentration

CO 8-hour Concentration (mg/m^3)			CO 8-hour Standard (mg		Exceed
Max. Modeled	Background [2]	Total	California	Federal	Standard?
0.08	4.0	4.1	10	10	NO

[1] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[2] Max. 8-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 24-hour PM_{10} Concentration

PM_{10} 24-hour Concentration ($\mu g/m^3$)			PM_{10} 24-Hour Standard (μg		Exceed
Max. Modeled	Background [1]	Total	California	Federal	Standard?
1.72	48.0	49.7	50	150	NO

Annual Average Geometric PM_{10} Concentration

PM_{10} Annual Concentration ($\mu g/m^3$)			PM_{10} Annual Standard (μg		Exceed
Max. Modeled [2]	Background [3]	Total	California	Federal	Standard?
0.02	27.0	27.0	30	---	NO

Annual Average Arithmetic PM_{10} Concentration

PM_{10} Annual Concentration ($\mu g/m^3$)			PM_{10} Annual Standard (μg		Exceed
Max. Modeled	Background [3]	Total	California	Federal	Standard?
0.02	28.0	28.0	---	50	NO

[1] Max. 24-hour value not exceeding the 50 $\mu g/m^3$ standard at the Chula Vista station 1996-1998; provided in 01/20/01 initial modeling review memo from SDAPCD

[2] Arithmetic average

[3] Provided in 01/20/01 initial modeling review memo from SDAPCD

* Lindbergh Field meteorological data (1996-1998) used for PM10 modeling

RAMCO - Chula Vista, CA

Case B(2a) - AQIA for Standard Operation Emissions - Turbine 1 With SCR Controls

9-May-01

Max Operating Hours Per Day	Max Operating Hours Per Year
21	4,620

NOx Emissions (5 ppm)				*CO Emissions (70 ppm)*		*PM_{10} Emissions*			
Max. 1-Hour NOx Emissions		Annual Average NOx Emissions		Max. 1-hour CO Emissions		Max. 24-Hour PM_{10} Emissions		Annual Average PM_{10} Emissions	
(lb/hr)	(g/sec)	(tons/yr)	(g/sec)	(lb/hr)	(g/s)	(lb/day)	(g/sec)	(tons/yr)	(g/sec)
14.07	1.77	32.5	0.94	108.0	13.61	95.4	0.50	10.5	0.30

Maximum 1-hour NO_2 Concentration

Max. 1-hr X/Q [1]	Max. Modeled NOx 1-hr Conc. ($\mu g/m^3$)	NO_2 1-hour Concentration ($\mu g/m^3$)			NO_2 1-Hour Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2a]	Background [3]	Total	California	Federal	
3.77	6.69	6.69	207.0	213.7	470	None	NO

Annual Average NO_2 Concentration

Ann. Avg. X/Q [1]	Max. Modeled NOx Ann. Conc. ($\mu g/m^3$)	NO_2 Annual Concentration ($\mu g/m^3$)			NO_2 Annual Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2b]	Background [4]	Total	California	Federal	
0.14	0.13	0.10	36.0	36.1	None	100	NO

[1] Obtained from ISCST3 modeling

[2a] Assumes NOx = NO_2

[2b] Default ambient NO_2/NOx ratio of 0.75 used

[3] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[4] Max. annual value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 1-hour CO Concentration

Max. 1-hr X/Q [1]	CO 1-hour Concentration (mg/m^3)			CO 1-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background [2]	Total	California	Federal	
3.77	0.05	6.1	6.2	23	40	NO

Maximum 8-hour CO Concentration

Max. 8-hr X/Q [1]	CO 8-hour Concentration (mg/m^3)			CO 8-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background [3]	Total	California	Federal	
2.32	0.03	4.0	4.0	10	10	NO

[1] Obtained from ISCST3 modeling

[2] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Max. 8-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 24-hour PM_{10} Concentration

Max. 24-hr X/Q [1]	PM_{10} 24-hour Concentration (µg/m³)			PM_{10} 24-Hour Standard (µg/m		Exceed Standard?
	Max. Modeled	Background [2]	Total	California	Federal	
1.08	0.54	48.0	48.5	50	150	NO

Annual Average Geometric PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m³)			PM_{10} Annual Standard (µg/m		Exceed Standard?
	Max. Modeled [3]	Background [4]	Total	California	Federal	
0.13	0.04	27.0	27.0	30	---	NO

Annual Average Arithmetic PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m³)			PM_{10} Annual Standard (µg/m		Exceed Standard?
	Max. Modeled	Background [4]	Total	California	Federal	
0.13	0.04	28.0	28.0	---	50	NO

[1] Obtained from ISCST3 modeling

[2] Max. 24-hour value not exceeding the 50µg/m³ standard at the Chula Vista station 1996-1998; provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Arithmetic average

[4] Provided in 01/20/01 initial modeling review memo from SDAPCD

* Lindbergh Field meteorological data (1996-1998) used for PM10 modeling

RAMCO - Chula Vista, CA

Case B(2b) - AQIA for Standard Operation Emissions - Turbine 2 - Phase 1 - No SCR / Ox-Cat Controls

9-May-01

Max Operating Hours Per Day	Max Operating Hours Per Year
24	1,340

NOx Emissions (25 ppm)				*CO Emissions (70 ppm)*		*PM_{10} Emissions*			
Max. 1-Hour NOx Emissions		Annual Average NOx Emissions		Max. 1-hour CO Emissions		Max. 24-Hour PM_{10} Emissions		Annual Average PM_{10} Emissions	
(lb/hr)	(g/sec)	(tons/yr)	(g/sec)	(lb/hr)	(g/s)	(lb/day)	(g/sec)	(tons/yr)	(g/sec)
74.33	9.37	49.8	1.43	116.4	14.67	117.5	0.62	3.3	0.09

Maximum 1-hour NO_2 Concentration

Max. 1-hr X/Q [1]	Max. Modeled NOx 1-hr Conc. ($\mu g/m^3$)	NO_2 1-hour Concentration ($\mu g/m^3$)			NO_2 1-Hour Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2a]	Background [3]	Total	California	Federal	
6.44	60.32	60.32	207.0	267.3	470	None	NO

Annual Average NO_2 Concentration

Ann. Avg. X/Q [1]	Max. Modeled NOx Ann. Conc. ($\mu g/m^3$)	NO_2 Annual Concentration ($\mu g/m^3$)			NO_2 Annual Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2b]	Background [4]	Total	California	Federal	
0.22	0.32	0.24	36.0	36.2	None	100	NO

[1] Obtained from ISCST3 modeling

[2a] Assumes NOx = NO_2

[2b] Default ambient NO_2/NOx ratio of 0.75 used

[3] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[4] Max. annual value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 1-hour CO Concentration

Max. 1-hr X/Q [1]	CO 1-hour Concentration (mg/m^3)			CO 1-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background [2]	Total	California	Federal	
6.44	0.09	6.1	6.2	23	40	NO

Maximum 8-hour CO Concentration

Max. 8-hr X/Q [1]	CO 8-hour Concentration (mg/m^3)			CO 8-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background [3]	Total	California	Federal	
3.61	0.05	4.0	4.1	10	10	NO

[1] Obtained from ISCST3 modeling

[2] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Max. 8-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 24-hour PM_{10} Concentration

Max. 24-hr X/Q [1]	PM_{10} 24-hour Concentration (µg/m³)			PM_{10} 24-Hour Standard (µg/m		Exceed Standard?
	Max. Modeled	Background[2]	Total	California	Federal	
1.79	1.11	48.0	49.1	50	150	NO

Annual Average Geometric PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m³)			PM_{10} Annual Standard (µg/m		Exceed Standard?
	Max. Modeled [3]	Background[4]	Total	California	Federal	
0.20	0.02	27.0	27.0	30	---	NO

Annual Average Arithmetic PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m³)			PM_{10} Annual Standard (µg/m		Exceed Standard?
	Max. Modeled	Background[4]	Total	California	Federal	
0.20	0.02	28.0	28.0	---	50	NO

[1] Obtained from ISCST3 modeling

[2] Max. 24-hour value not exceeding the 50µg/m³ standard at the Chula Vista station 1996-1998; provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Arithmetic average

[4] Provided in 01/20/01 initial modeling review memo from SDAPCD

* Lindbergh Field meteorological data (1996-1998) used for PM10 modeling

CASE C: AQIA CALCULATIONS

RAMCO - Chula Vista, CA

Case C(1a) - AQIA for Standard Operation Emissions - Turbine 1 With SCR Controls

9-May-01

Max Operating Hours Per Day	Max Operating Hours Per Year
24	600

NOx Emissions (5 ppm)				*CO Emissions (70 ppm)*		*PM_{10} Emissions*			
Max. 1-Hour NOx Emissions		Annual Average NOx Emissions		Max. 1-hour CO Emissions		Max. 24-Hour PM_{10} Emissions		Annual Average PM_{10} Emissions	
(lb/hr)	(g/sec)	(tons/yr)	(g/sec)	(lb/hr)	(g/s)	(lb/day)	(g/sec)	(tons/yr)	(g/sec)
14.07	1.77	4.2	0.12	108.0	13.61	109.0	0.57	1.4	0.04

Maximum 1-hour NO_2 Concentration

Max. 1-hr X/Q [1]	Max. Modeled NOx 1-hr Conc. ($\mu g/m^3$)	NO_2 1-hour Concentration ($\mu g/m^3$)			NO_2 1-Hour Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2a]	Background [3]	Total	California	Federal	
3.77	6.69	6.69	207.0	213.7	470	None	NO

Annual Average NO_2 Concentration

Ann. Avg. X/Q [1]	Max. Modeled NOx Ann. Conc. ($\mu g/m^3$)	NO_2 Annual Concentration ($\mu g/m^3$)			NO_2 Annual Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2b]	Background [4]	Total	California	Federal	
0.14	0.02	0.01	36.0	36.0	None	100	NO

[1] Obtained from ISCST3 modeling

[2a] Assumes NOx = NO_2

[2b] Default ambient NO_2/NOx ratio of 0.75 used

[3] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[4] Max. annual value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 1-hour CO Concentration

Max. 1-hr X/Q [1]	CO 1-hour Concentration (mg/m^3)			CO 1-hour Standard (mg/m		Exceed Standard?
	Max. Modeled	Background [2]	Total	California	Federal	
3.77	0.05	6.1	6.2	23	40	NO

Maximum 8-hour CO Concentration

Max. 8-hr X/Q [1]	CO 8-hour Concentration (mg/m^3)			CO 8-hour Standard (mg/m		Exceed Standard?
	Max. Modeled	Background [3]	Total	California	Federal	
2.32	0.03	4.0	4.0	10	10	NO

[1] Obtained from ISCST3 modeling

[2] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Max. 8-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 24-hour PM_{10} Concentration

Max. 24-hr X/Q [1]	PM_{10} 24-hour Concentration (µg/m³)			PM_{10} 24-Hour Standard (µg/m		Exceed Standard?
	Max. Modeled	Background [2]	Total	California	Federal	
1.08	0.62	48.0	48.6	50	150	NO

Annual Average Geometric PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m³)			PM_{10} Annual Standard (µg/m		Exceed Standard?
	Max. Modeled [3]	Background [4]	Total	California	Federal	
0.13	0.00	27.0	27.0	30	---	NO

Annual Average Arithmetic PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m³)			PM_{10} Annual Standard (µg/m		Exceed Standard?
	Max. Modeled	Background [4]	Total	California	Federal	
0.13	0.00	28.0	28.0	---	50	NO

[1] Obtained from ISCST3 modeling

[2] Max. 24-hour value not exceeding the 50µg/m³ standard at the Chula Vista station 1996-1998; provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Arithmetic average

[4] Provided in 01/20/01 initial modeling review memo from SDAPCD

* Lindbergh Field meteorological data (1996-1998) used for PM10 modeling

RAMCO - Chula Vista, CA

Case C(1b) - AQIA for Variance Emissions - Turbine 2 - Phase 1 - No SCR / Ox-Cat Controls (for NOx and CO)

9-May-01

Max Operating Hours Per Day	Max Operating Hours Per Year
12	600

NOx Emissions (50 ppm)				*CO Emissions (200 ppm)*		*PM_{10} Emissions*			
Max. 1-Hour NOx Emissions		Annual Average NOx Emissions		Max. 1-hour CO Emissions		Max. 24-Hour PM_{10} Emissions		Annual Average PM_{10} Emissions	
(lb/hr)	(g/sec)	(tons/yr)	(g/sec)	(lb/hr)	(g/s)	(lb/day)	(g/sec)	(tons/yr)	(g/sec)
148.67	18.73	44.6	1.28	332.6	41.90	58.7	0.31	1.5	0.04

Maximum 1-hour NO_2 Concentration

Max. 1-hr X/Q [1]	Max. Modeled NOx 1-hr Conc. ($\mu g/m^3$)	NO_2 1-hour Concentration ($\mu g/m^3$)			NO_2 1-Hour Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2a]	Background [3]	Total	California	Federal	
6.44	120.65	120.65	207.0	327.6	470	None	NO

Annual Average NO_2 Concentration

Ann. Avg. X/Q [1]	Max. Modeled NOx Ann. Conc. ($\mu g/m^3$)	NO_2 Annual Concentration ($\mu g/m^3$)			NO_2 Annual Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2b]	Background [4]	Total	California	Federal	
0.22	0.29	0.22	36.0	36.2	None	100	NO

[1] Obtained from ISCST3 modeling

[2a] Assumes NOx = NO_2

[2b] Default ambient NO_2/NOx ratio of 0.75 used

[3] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[4] Max. annual value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 1-hour CO Concentration

Max. 1-hr X/Q [1]	CO 1-hour Concentration (mg/m^3)			CO 1-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background [2]	Total	California	Federal	
6.44	0.27	6.1	6.4	23	40	NO

Maximum 8-hour CO Concentration

Max. 8-hr X/Q [1]	CO 8-hour Concentration (mg/m^3)			CO 8-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background [3]	Total	California	Federal	
3.61	0.15	4.0	4.2	10	10	NO

[1] Obtained from ISCST3 modeling

[2] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Max. 8-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 24-hour PM_{10} Concentration

Max. 24-hr X/Q [1]	PM_{10} 24-hour Concentration ($\mu g/m^3$)			PM_{10} 24-Hour Standard ($\mu g/m$		Exceed Standard?
	Max. Modeled	Background [2]	Total	California	Federal	
1.79	0.55	48.0	48.6	50	150	NO

Annual Average Geometric PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration ($\mu g/m^3$)			PM_{10} Annual Standard ($\mu g/m$		Exceed Standard?
	Max. Modeled [3]	Background [4]	Total	California	Federal	
0.20	0.01	27.0	27.0	30	---	NO

Annual Average Arithmetic PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration ($\mu g/m^3$)			PM_{10} Annual Standard ($\mu g/m$		Exceed Standard?
	Max. Modeled	Background [4]	Total	California	Federal	
0.20	0.01	28.0	28.0	---	50	NO

[1] Obtained from ISCST3 modeling

[2] Max. 24-hour value not exceeding the 50$\mu g/m^3$ standard at the Chula Vista station 1996-1998; provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Arithmetic average

[4] Provided in 01/20/01 initial modeling review memo from SDAPCD

* Lindbergh Field meteorological data (1996-1998) used for PM10 modeling

RAMCO - Chula Vista, CA

Case C(1c) - AQIA Summary - Combination of Turbine Impacts

Turbine 1 Standard Operations With SCR and Turbine 2 - Phase 1 Variance Emissions No SCR Concurrent Operations

9-May-01

Turbine 1		*Turbine 2*	
Max Operating Hours Per Day	**Max Operating Hours Per Year**	**Max Operating Hours Per Day**	**Max Operating Hours Per Year**
24	600	12	600

Maximum 1-hour NO_2 Concentration

NO_2 1-hour Concentration ($\mu g/m^3$)			**NO_2 1-Hour Standard ($\mu g/m$**		**Exceed**
Max. Modeled [1]	**Background [3]**	**Total**	**California**	**Federal**	**Standard?**
127.33	207.0	334.3	470	None	NO

Annual Average NO_2 Concentration

NO_2 Annual Concentration ($\mu g/m^3$)			**NO_2 Annual Standard ($\mu g/$**		**Exceed**
Max. Modeled [2]	**Background [4]**	**Total**	**California**	**Federal**	**Standard?**
0.23	36.0	36.2	None	100	NO

[1] Assumes NOx = NO_2

[2] Default ambient NO_2/NOx ratio of 0.75 used

[3] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[4] Max. annual value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 1-hour CO Concentration

CO 1-hour Concentration (mg/m^3)			**CO 1-hour Standard (mg**		**Exceed**
Max. Modeled	**Background [1]**	**Total**	**California**	**Federal**	**Standard?**
0.32	6.1	6.4	23	40	NO

Maximum 8-hour CO Concentration

CO 8-hour Concentration (mg/m^3)			**CO 8-hour Standard (mg**		**Exceed**
Max. Modeled	**Background [2]**	**Total**	**California**	**Federal**	**Standard?**
0.18	4.0	4.2	10	10	NO

[1] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[2] Max. 8-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 24-hour PM_{10} Concentration

PM_{10} 24-hour Concentration ($\mu g/m^3$)			**PM_{10} 24-Hour Standard (μg**		**Exceed**
Max. Modeled	**Background [1]**	**Total**	**California**	**Federal**	**Standard?**
1.17	48.0	49.2	50	150	NO

Annual Average Geometric PM_{10} Concentration

PM_{10} Annual Concentration ($\mu g/m^3$)			**PM_{10} Annual Standard (μg**		**Exceed**
Max. Modeled [2]	**Background [3]**	**Total**	**California**	**Federal**	**Standard?**
0.01	27.0	27.0	30	---	NO

Annual Average Arithmetic PM_{10} Concentration

PM_{10} Annual Concentration ($\mu g/m^3$)			**PM_{10} Annual Standard (μg**		**Exceed**
Max. Modeled	**Background [3]**	**Total**	**California**	**Federal**	**Standard?**
0.01	28.0	28.0	---	50	NO

[1] Max. 24-hour value not exceeding the 50 $\mu g/m^3$ standard at the Chula Vista station 1996-1998; provided in 01/20/01 initial modeling review memo from SDAPCD

[2] Arithmetic average

[3] Provided in 01/20/01 initial modeling review memo from SDAPCD

* Lindbergh Field meteorological data (1996-1998) used for PM10 modeling

RAMCO - Chula Vista, CA

Case C(2a) - AQIA for Standard Operation Emissions - Turbine 1 With SCR Controls

9-May-01

Max Operating Hours Per Day	Max Operating Hours Per Year
21	4,620

NOx Emissions (5 ppm)				*CO Emissions (70 ppm)*		*PM_{10} Emissions*			
Max. 1-Hour NOx Emissions		Annual Average NOx Emissions		Max. 1-hour CO Emissions		Max. 24-Hour PM_{10} Emissions		Annual Average PM_{10} Emissions	
(lb/hr)	(g/sec)	(tons/yr)	(g/sec)	(lb/hr)	(g/s)	(lb/day)	(g/sec)	(tons/yr)	(g/sec)
14.07	1.77	32.5	0.94	108.0	13.61	95.4	0.50	10.5	0.30

Maximum 1-hour NO_2 Concentration

Max. 1-hr X/Q [1]	Max. Modeled NOx 1-hr Conc. (mg/m^3)	NO_2 1-hour Concentration (mg/m^3)			NO_2 1-Hour Standard (mg/m^3)		Exceed Standard?
		Max. Modeled [2a]	Background [3]	Total	California	Federal	
3.77	6.69	6.69	207.0	213.7	470	None	NO

Annual Average NO_2 Concentration

Ann. Avg. X/Q [1]	Max. Modeled NOx Ann. Conc. (mg/m^3)	NO_2 Annual Concentration (mg/m^3)			NO_2 Annual Standard (mg/m^3)		Exceed Standard?
		Max. Modeled [2b]	Background [4]	Total	California	Federal	
0.14	0.13	0.10	36.0	36.1	None	100	NO

[1] Obtained from ISCST3 modeling

[2a] Assumes NOx = NO_2

[2b] Default ambient NO_2/NOx ratio of 0.75 used

[3] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[4] Max. annual value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 1-hour CO Concentration

Max. 1-hr X/Q [1]	CO 1-hour Concentration (mg/m^3)			CO 1-hour Standard (mg/m		Exceed Standard?
	Max. Modeled	Background [2]	Total	California	Federal	
3.77	0.05	6.1	6.2	23	40	NO

Maximum 8-hour CO Concentration

Max. 8-hr X/Q [1]	CO 8-hour Concentration (mg/m^3)			CO 8-hour Standard (mg/m		Exceed Standard?
	Max. Modeled	Background [3]	Total	California	Federal	
2.32	0.03	4.0	4.0	10	10	NO

[1] Obtained from ISCST3 modeling

[2] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Max. 8-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 24-hour PM_{10} Concentration

Max. 24-hr X/Q [1]	PM_{10} 24-hour Concentration (mg/m^3)			PM_{10} 24-Hour Standard (mg/m		Exceed Standard?
	Max. Modeled	Background [2]	Total	California	Federal	
1.08	0.54	48.0	48.5	50	150	NO

Annual Average Geometric PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (mg/m^3)			PM_{10} Annual Standard (mg/m		Exceed Standard?
	Max. Modeled [3]	Background [4]	Total	California	Federal	
0.13	0.04	27.0	27.0	30	---	NO

Annual Average Arithmetic PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (mg/m^3)			PM_{10} Annual Standard (mg/m		Exceed Standard?
	Max. Modeled	Background [4]	Total	California	Federal	
0.13	0.04	28.0	28.0	---	50	NO

[1] Obtained from ISCST3 modeling

[2] Max. 24-hour value not exceeding the 50 µg/m^3 standard at the Chula Vista station 1996-1998; provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Arithmetic average

[4] Provided in 01/20/01 initial modeling review memo from SDAPCD

* Lindbergh Field meteorological data (1996-1998) used for PM10 modeling

RAMCO - Chula Vista, CA

Case C(2b) - AQIA for Variance Emissions - Turbine 2 - Phase 1 - No SCR Controls (for NOx and CO)

9-May-01

Max Operating Hours Per Day	Max Operating Hours Per Year
12	600

NOx Emissions (50 ppm)				*CO Emissions (200 ppm)*		*PM_{10} Emissions*			
Max. 1-Hour NOx Emissions		Annual Average NOx Emissions		Max. 1-hour CO Emissions		Max. 24-Hour PM_{10} Emissions		Annual Average PM_{10} Emissions	
(lb/hr)	(g/sec)	(tons/yr)	(g/sec)	(lb/hr)	(g/s)	(lb/day)	(g/sec)	(tons/yr)	(g/sec)
148.67	18.73	44.6	1.28	332.6	41.90	58.7	0.31	1.5	0.04

Maximum 1-hour NO_2 Concentration

Max. 1-hr X/Q [1]	Max. Modeled NOx 1-hr Conc. ($\mu g/m^3$)	NO_2 1-hour Concentration ($\mu g/m^3$)			NO_2 1-Hour Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2a]	Background [3]	Total	California	Federal	
6.44	120.65	120.65	207.0	327.6	470	None	NO

Annual Average NO_2 Concentration

Ann. Avg. X/Q [1]	Max. Modeled NOx Ann. Conc. ($\mu g/m^3$)	NO_2 Annual Concentration ($\mu g/m^3$)			NO_2 Annual Standard ($\mu g/m^3$)		Exceed Standard?
		Max. Modeled [2b]	Background [4]	Total	California	Federal	
0.22	0.29	0.22	36.0	36.2	None	100	NO

[1] Obtained from ISCST3 modeling

[2a] Assumes NOx = NO_2

[2b] Default ambient NO_2/NOx ratio of 0.75 used

[3] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[4] Max. annual value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 1-hour CO Concentration

Max. 1-hr X/Q [1]	CO 1-hour Concentration (mg/m^3)			CO 1-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background [2]	Total	California	Federal	
6.44	0.27	6.1	6.4	23	40	NO

Maximum 8-hour CO Concentration

Max. 8-hr X/Q [1]	CO 8-hour Concentration (mg/m^3)			CO 8-hour Standard (mg/m^3)		Exceed Standard?
	Max. Modeled	Background [3]	Total	California	Federal	
3.61	0.15	4.0	4.2	10	10	NO

[1] Obtained from ISCST3 modeling

[2] Max. 1-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Max. 8-hour value from Chula Vista station (1996-1998 SDAPCD data) as provided in 01/20/01 initial modeling review memo from SDAPCD

Maximum 24-hour PM_{10} Concentration

Max. 24-hr X/Q [1]	PM_{10} 24-hour Concentration (µg/m^3)			PM_{10} 24-Hour Standard (µg/m		Exceed Standard?
	Max. Modeled	Background [2]	Total	California	Federal	
1.79	0.55	48.0	48.6	50	150	NO

Annual Average Geometric PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m^3)			PM_{10} Annual Standard (µg/m		Exceed Standard?
	Max. Modeled [3]	Background [4]	Total	California	Federal	
0.20	0.01	27.0	27.0	30	---	NO

Annual Average Arithmetic PM_{10} Concentration

Ann. Avg. X/Q [1]	PM_{10} Annual Concentration (µg/m^3)			PM_{10} Annual Standard (µg/m		Exceed Standard?
	Max. Modeled	Background [4]	Total	California	Federal	
0.20	0.01	28.0	28.0	---	50	NO

[1] Obtained from ISCST3 modeling

[2] Max. 24-hour value not exceeding the 50µg/m^3 standard at the Chula Vista station 1996-1998; provided in 01/20/01 initial modeling review memo from SDAPCD

[3] Arithmetic average

[4] Provided in 01/20/01 initial modeling review memo from SDAPCD

* Lindbergh Field meteorological data (1996-1998) used for PM10 modeling

CASE A: HRA CALCULATIONS

RAMCO - Chula Vista, CA

Case A(1a) - Rule 1200 Health Risk Assessment for Standard Operations Emissions - Turbine 1 With SCR Controls

9-May-01

Turbine Output (MW):	44
Heat Rate (Btu/kwh):	15,637
Heat Rate (MMBTU/hr):	688
Btu/cf Conversion:	1,000
Annual Operating Hours:	3325
Max. 1-Hr. X/Q	3.77
Max. Annual Avg. X/Q	0.14

		Emission Rates				Max.	Max.	Cancer		Chronic		Acute	Acute	Maximum		
	Emission Factor	Hourly		Annual		1-Hour	Ann. Conc.	Inh URF	Cancer	Inh REL	Chronic	REL	REL Avg.	Cancer	Chronic	Acute
Substance	(lb/MMBTU)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(ug/m3)	(ug/m3)	(ug/m3)-1	MPF	(ug/m3)	MPF	(ug/m3)	Time (hrs)	Risk	HI	HI
Acetaldehyde	4.00E-05	2.75E-02	3.47E-03	9.15E+01	1.32E-03	1.31E-02	1.87E-04	2.70E-06	1	9.00E+00	1	n/a	n/a	5.05E-10	2.08E-05	n/a
Acrolein	6.40E-06	4.40E-03	5.55E-04	1.46E+01	2.11E-04	2.09E-03	2.99E-05	n/a	n/a	2.00E-02	1	1.90E-01	1	n/a	1.50E-03	1.10E-02
Ammonia	1.71E-02	1.18E+01	1.48E+00	3.92E+04	5.63E-01	5.60E+00	8.00E-02	n/a	n/a	2.00E+02	1	3.20E+03	1	n/a	4.00E-04	1.75E-03
Benzene	1.20E-05	8.26E-03	1.04E-03	2.75E+01	3.95E-04	3.92E-03	5.61E-05	2.90E-05	1	6.00E+01	1	1.30E+03	6	1.63E-09	9.35E-07	3.02E-06
1,3-Butadiene	4.30E-07	2.96E-04	3.73E-05	9.84E-01	1.41E-05	1.41E-04	2.01E-06	1.70E-04	1	n/a	n/a	n/a	n/a	3.42E-10	n/a	n/a
Ethylbenzene	3.20E-05	2.20E-02	2.77E-03	7.32E+01	1.05E-03	1.05E-02	1.50E-04	n/a	n/a	2.00E+03	1	n/a	n/a	n/a	7.48E-08	n/a
Formaldehyde	7.10E-04	4.88E-01	6.15E-02	1.62E+03	2.34E-02	2.32E-01	3.32E-03	6.00E-06	1	3.00E+00	1	9.40E+01	1	1.99E-08	1.11E-03	2.47E-03
Naphthalene	1.30E-06	8.94E-04	1.13E-04	2.97E+00	4.28E-05	4.25E-04	6.08E-06	n/a	n/a	9.00E+00	4.8	n/a	n/a	n/a	3.24E-06	n/a
PAHs (as benzo(a)pyrene)	2.20E-06	1.51E-03	1.91E-04	5.03E+00	7.24E-05	7.19E-04	1.03E-05	1.70E-03	7.12	n/a	n/a	n/a	n/a	1.24E-07	n/a	n/a
Propylene Oxide	2.90E-05	2.00E-02	2.51E-03	6.63E+01	9.54E-04	9.48E-03	1.36E-04	3.70E-06	1	3.00E+01	1	3.10E+03	1	5.02E-10	4.52E-06	3.06E-06
Toluene	1.30E-04	8.94E-02	1.13E-02	2.97E+02	4.28E-03	4.25E-02	6.08E-04	n/a	n/a	3.00E+02	1	3.70E+04	1	n/a	2.03E-06	1.15E-06
Xylenes	6.40E-05	4.40E-02	5.55E-03	1.46E+02	2.11E-03	2.09E-02	2.99E-04	n/a	n/a	7.00E+02	1	2.20E+04	1	n/a	4.27E-07	9.51E-07
SUM														***1.5E-07***	***0.003***	***0.015***
Exceed Thresholds??														NO	NO	NO
Max. hrs/yr increase:														8760	8760	n/a

-- Natural gas heat value (HHV) is value typically used by SDAPCD

-- Emission factors from U.S. EPA AP-42, Section 3.1.

-- Cancer URFs are final values currently accepted by OEHHA and APCD; chronic and acute REL values are those adopted by OEHHA in May 2000

-- MPF factors are those provided by SDAPCD; MPF for PAHs is 7.12 for benzo(a)pyrene as recommended by Tom Weeks of the APCD.

-- Chronic and acute HI values summed across all target organs; results are conservative

-- Maximum one-hour and annual impacts anywhere were selected

RAMCO - Chula Vista, CA

Ammonia Slip Emission Factor Calculation - Turbine 1 [1]

Ammonia Slip (ppm):	10
Exhaust Temp (deg F):	789
Exhaust Temp (deg K):	694
Exhaust Flow (acfm):	1,054,400
Fuel Use (MMscf/hr):	0.688
Heat Rate (MMBTU/hr):	688

lb NH3/scf	**scf Emiss/hr**	**lb NH3/hr**	**Emission Factor** ***lb NH3 emission per MMscf natural gas***	**Emission Factor** ***lb NH3 emission per MMBTU***
4.73E-07	2.49E+07	11.78	17.1	1.71E-02

[1] Follows calculation from D. Brightman at SDAPCD

RAMCO - Chula Vista, CA

Case A(1b) - Rule 1200 Health Risk Assessment for Standard Operations Emissions - Turbine 2 - Phase 2 With SCR / Ox-Cat Controls

10-May-01

Turbine Output (MW):	62.4
Heat Rate (Btu/kwh):	12,784
Heat Rate (MMBTU/hr):	798
Btu/cf Conversion:	1,000
Annual Operating Hours:	3325
Max. 1-Hr. X/Q	3.26
Max. Annual Avg. X/Q	0.13

		Emission Rates				Max.	Max.	Cancer		Chronic		Acute	Acute	Maximum		
	Emission Factor	Hourly		Annual		1-Hour	Ann. Conc.	Inh URF	Cancer	Inh REL	Chronic	REL	REL Avg.	Cancer	Chronic	Acute
Substance	(lb/MMBTU)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(ug/m3)	(ug/m3)	(ug/m3)-1	MPF	(ug/m3)	MPF	(ug/m3)	Time (hrs)	Risk	HI	HI
Acetaldehyde	4.00E-05	3.19E-02	4.02E-03	1.06E+02	1.53E-03	1.31E-02	1.97E-04	2.70E-06	1	9.00E+00	1	n/a	n/a	5.31E-10	2.19E-05	n/a
Acrolein	6.40E-06	5.11E-03	6.43E-04	1.70E+01	2.44E-04	2.10E-03	3.15E-05	n/a	n/a	2.00E-02	1	1.90E-01	1	n/a	1.57E-03	1.10E-02
Ammonia	1.61E-02	1.29E+01	1.62E+00	4.28E+04	6.16E-01	5.29E+00	7.94E-02	n/a	n/a	2.00E+02	1	3.20E+03	1	n/a	3.97E-04	1.65E-03
Benzene	1.20E-05	9.57E-03	1.21E-03	3.18E+01	4.58E-04	3.93E-03	5.91E-05	2.90E-05	1	6.00E+01	1	1.30E+03	6	1.71E-09	9.84E-07	3.03E-06
1,3-Butadiene	4.30E-07	3.43E-04	4.32E-05	1.14E+00	1.64E-05	1.41E-04	2.12E-06	1.70E-04	1	n/a	n/a	n/a	n/a	3.60E-10	n/a	n/a
Ethylbenzene	3.20E-05	2.55E-02	3.22E-03	8.49E+01	1.22E-03	1.05E-02	1.57E-04	n/a	n/a	2.00E+03	1	n/a	n/a	n/a	7.87E-08	n/a
Formaldehyde	7.10E-04	5.66E-01	7.14E-02	1.88E+03	2.71E-02	2.33E-01	3.49E-03	6.00E-06	1	3.00E+00	1	9.40E+01	1	2.10E-08	1.16E-03	2.48E-03
Naphthalene	1.30E-06	1.04E-03	1.31E-04	3.45E+00	4.96E-05	4.26E-04	6.40E-06	n/a	n/a	9.00E+00	4.8	n/a	n/a	n/a	3.41E-06	n/a
PAHs (as benzo(a)pyrene)	2.20E-06	1.76E-03	2.21E-04	5.84E+00	8.39E-05	7.21E-04	1.08E-05	1.70E-03	7.12	n/a	n/a	n/a	n/a	1.31E-07	n/a	n/a
Propylene Oxide	2.90E-05	2.31E-02	2.91E-03	7.69E+01	1.11E-03	9.51E-03	1.43E-04	3.70E-06	1	3.00E+01	1	3.10E+03	1	5.28E-10	4.76E-06	3.07E-06
Toluene	1.30E-04	1.04E-01	1.31E-02	3.45E+02	4.96E-03	4.26E-02	6.40E-04	n/a	n/a	3.00E+02	1	3.70E+04	1	n/a	2.13E-06	1.15E-06
Xylenes	6.40E-05	5.11E-02	6.43E-03	1.70E+02	2.44E-03	2.10E-02	3.15E-04	n/a	n/a	7.00E+02	1	2.20E+04	1	n/a	4.50E-07	9.54E-07
SUM														***1.6E-07***	***0.003***	***0.015***
Exceed Thresholds??														NO	NO	NO
Max. hrs/yr increase:														8760	8760	n/a

-- Natural gas heat value (HHV) is value typically used by SDAPCD

-- Emission factors from U.S. EPA AP-42, Section 3.1.

-- Cancer URFs are final values currently accepted by OEHHA and APCD; chronic and acute REL values are those adopted by OEHHA in May 2000

-- MPF factors are those provided by SDAPCD; MPF for PAHs is 7.12 for benzo(a)pyrene as recommended by Tom Weeks of the APCD.

-- Chronic and acute HI values summed across all target organs; results are conservative

-- Maximum one-hour and annual impacts anywhere were selected

RAMCO - Chula Vista, CA

Ammonia Slip Emission Factor Calculation - Turbine 2 Phase 2 [1]

Ammonia Slip (ppm):	10
Exhaust Temp (deg F):	818
Exhaust Temp (deg K):	710
Exhaust Flow (acfm):	1,179,078
Fuel Use (MMscf/hr):	0.798
Heat Rate (MMBTU/hr):	798

lb NH3/scf	**scf Emiss/hr**	**lb NH3/hr**	**Emission Factor** ***lb NH3 emission per MMscf natural gas***	**Emission Factor** ***lb NH3 emission per MMBTU***
4.73E-07	2.72E+07	12.88	16.1	1.61E-02

[1] Follows calculation from D. Brightman at SDAPCD

RAMCO - Chula Vista, CA

Case A(1c) - Rule 1200 Health Risk Assessment - Combination of Turbine Risks
Final Project Standard Operations (Turbine 1 With SCR and Turbine 2 With SCR / Ox-Cat Concu
9-May-01

Substance	Maximum Risks		
	Cancer Risk	**Chronic HI**	**Acute HI**
Acetaldehyde	1.04E-09	4.26E-05	n/a
Acrolein	n/a	3.07E-03	2.21E-02
Ammonia	n/a	7.97E-04	3.40E-03
Benzene	3.34E-09	1.92E-06	6.04E-06
1,3-Butadiene	7.01E-10	n/a	n/a
Ethylbenzene	n/a	1.54E-07	n/a
Formaldehyde	4.09E-08	2.27E-03	4.95E-03
Naphthalene	n/a	6.65E-06	n/a
PAHs (as benzo(a)pyrene)	2.56E-07	n/a	n/a
Propylene Oxide	1.03E-09	9.28E-06	6.13E-06
Toluene	n/a	4.16E-06	2.30E-06
Xylenes	n/a	8.77E-07	1.90E-06
SUM	***3.0E-07***	***0.006***	***0.030***
Exceed Thresholds??	NO	NO	NO

-- Chronic and acute HI values summed across all target organs; results are conservative

RAMCO - Chula Vista, CA

Case A(2a) - Rule 1200 Health Risk Assessment for Standard Operations Emissions - Turbine 1 With SCR Controls

9-May-01

Turbine Output (MW):	44
Heat Rate (Btu/kwh):	15,637
Heat Rate (MMBTU/hr):	688
Btu/cf Conversion:	1,000
Annual Operating Hours:	4620
Max. 1-Hr. X/Q	3.77
Max. Annual Avg. X/Q	0.14

		Emission Rates				Max.	Max.	Cancer		Chronic		Acute	Acute	Maximum		
	Emission Factor	Hourly		Annual		1-Hour	Ann. Conc.	Inh URF	Cancer	Inh REL	Chronic	REL	REL Avg.	Cancer	Chronic	Acute
Substance	(lb/MMBTU)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(ug/m3)	(ug/m3)	(ug/m3)-1	MPF	(ug/m3)	MPF	(ug/m3)	Time (hrs)	Risk	HI	HI
Acetaldehyde	4.00E-05	2.75E-02	3.47E-03	1.27E+02	1.83E-03	1.31E-02	2.60E-04	2.70E-06	1	9.00E+00	1	n/a	n/a	7.01E-10	2.89E-05	n/a
Acrolein	6.40E-06	4.40E-03	5.55E-04	2.03E+01	2.93E-04	2.09E-03	4.16E-05	n/a	n/a	2.00E-02	1	1.90E-01	1	n/a	2.08E-03	1.10E-02
Ammonia	1.71E-02	1.18E+01	1.48E+00	5.44E+04	7.83E-01	5.60E+00	1.11E-01	n/a	n/a	2.00E+02	1	3.20E+03	1	n/a	5.56E-04	1.75E-03
Benzene	1.20E-05	8.26E-03	1.04E-03	3.81E+01	5.49E-04	3.92E-03	7.79E-05	2.90E-05	1	6.00E+01	1	1.30E+03	6	2.26E-09	1.30E-06	3.02E-06
1,3-Butadiene	4.30E-07	2.96E-04	3.73E-05	1.37E+00	1.97E-05	1.41E-04	2.79E-06	1.70E-04	1	n/a	n/a	n/a	n/a	4.75E-10	n/a	n/a
Ethylbenzene	3.20E-05	2.20E-02	2.77E-03	1.02E+02	1.46E-03	1.05E-02	2.08E-04	n/a	n/a	2.00E+03	1	n/a	n/a	n/a	1.04E-07	n/a
Formaldehyde	7.10E-04	4.88E-01	6.15E-02	2.26E+03	3.25E-02	2.32E-01	4.61E-03	6.00E-06	1	3.00E+00	1	9.40E+01	1	2.77E-08	1.54E-03	2.47E-03
Naphthalene	1.30E-06	8.94E-04	1.13E-04	4.13E+00	5.94E-05	4.25E-04	8.44E-06	n/a	n/a	9.00E+00	4.8	n/a	n/a	n/a	4.50E-06	n/a
PAHs (as benzo(a)pyrene)	2.20E-06	1.51E-03	1.91E-04	6.99E+00	1.01E-04	7.19E-04	1.43E-05	1.70E-03	7.12	n/a	n/a	n/a	n/a	1.73E-07	n/a	n/a
Propylene Oxide	2.90E-05	2.00E-02	2.51E-03	9.22E+01	1.33E-03	9.48E-03	1.88E-04	3.70E-06	1	3.00E+01	1	3.10E+03	1	6.97E-10	6.28E-06	3.06E-06
Toluene	1.30E-04	8.94E-02	1.13E-02	4.13E+02	5.94E-03	4.25E-02	8.44E-04	n/a	n/a	3.00E+02	1	3.70E+04	1	n/a	2.81E-06	1.15E-06
Xylenes	6.40E-05	4.40E-02	5.55E-03	2.03E+02	2.93E-03	2.09E-02	4.16E-04	n/a	n/a	7.00E+02	1	2.20E+04	1	n/a	5.94E-07	9.51E-07
SUM														***2.0E-07***	***0.004***	***0.015***
Exceed Thresholds??														NO	NO	NO
Max. hrs/yr increase:														8760	8760	n/a

-- Natural gas heat value (HHV) is value typically used by SDAPCD

-- Emission factors from U.S. EPA AP-42, Section 3.1.

-- Cancer URFs are final values currently accepted by OEHHA and APCD; chronic and acute REL values are those adopted by OEHHA in May 2000

-- MPF factors are those provided by SDAPCD; MPF for PAHs is 7.12 for benzo(a)pyrene as recommended by Tom Weeks of the APCD.

-- Chronic and acute HI values summed across all target organs; results are conservative

-- Maximum one-hour and annual impacts anywhere were selected

RAMCO - Chula Vista, CA

Ammonia Slip Emission Factor Calculation - Turbine 1 [1]

Ammonia Slip (ppm):	10
Exhaust Temp (deg F):	789
Exhaust Temp (deg K):	694
Exhaust Flow (acfm):	1,054,400
Fuel Use (MMscf/hr):	0.688
Heat Rate (MMBTU/hr):	688

lb NH3/scf	**scf Emiss/hr**	**lb NH3/hr**	**Emission Factor** ***lb NH3 emission per MMscf natural gas***	**Emission Factor** ***lb NH3 emission per MMBTU***
4.73E-07	2.49E+07	11.78	17.1	1.71E-02

[1] Follows calculation from D. Brightman at SDAPCD

RAMCO - Chula Vista, CA

Case A(2b) - Rule 1200 Health Risk Assessment for Standard Operations Emissions - Turbine 2 - Phase 2 With SCR / Ox-Cat Controls

9-May-01

Turbine Output (MW):	62.4
Heat Rate (Btu/kwh):	12,784
Heat Rate (MMBTU/hr):	798
Btu/cf Conversion:	1,000
Annual Operating Hours:	6250
Max. 1-Hr. X/Q	3.26
Max. Annual Avg. X/Q	0.13

		Emission Rates				Max.	Max.	Cancer		Chronic		Acute	Acute	Maximum		
	Emission Factor	Hourly		Annual		1-Hour	Ann. Conc.	Inh URF	Cancer	Inh REL	Chronic	REL	REL Avg.	Cancer	Chronic	Acute
Substance	(lb/MMBTU)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(ug/m3)	(ug/m3)	(ug/m3)-1	MPF	(ug/m3)	MPF	(ug/m3)	Time (hrs)	Risk	HI	HI
Acetaldehyde	4.00E-05	3.19E-02	4.02E-03	1.99E+02	2.87E-03	1.31E-02	3.70E-04	2.70E-06	1	9.00E+00	1	n/a	n/a	9.99E-10	4.11E-05	n/a
Acrolein	6.40E-06	5.11E-03	6.43E-04	3.19E+01	4.59E-04	2.10E-03	5.92E-05	n/a	n/a	2.00E-02	1	1.90E-01	1	n/a	2.96E-03	1.10E-02
Ammonia	1.61E-02	1.29E+01	1.62E+00	8.05E+04	1.16E+00	5.29E+00	1.49E-01	n/a	n/a	2.00E+02	1	3.20E+03	1	n/a	7.47E-04	1.65E-03
Benzene	1.20E-05	9.57E-03	1.21E-03	5.98E+01	8.61E-04	3.93E-03	1.11E-04	2.90E-05	1	6.00E+01	1	1.30E+03	6	3.22E-09	1.85E-06	3.03E-06
1,3-Butadiene	4.30E-07	3.43E-04	4.32E-05	2.14E+00	3.08E-05	1.41E-04	3.98E-06	1.70E-04	1	n/a	n/a	n/a	n/a	6.76E-10	n/a	n/a
Ethylbenzene	3.20E-05	2.55E-02	3.22E-03	1.60E+02	2.29E-03	1.05E-02	2.96E-04	n/a	n/a	2.00E+03	1	n/a	n/a	n/a	1.48E-07	n/a
Formaldehyde	7.10E-04	5.66E-01	7.14E-02	3.54E+03	5.09E-02	2.33E-01	6.57E-03	6.00E-06	1	3.00E+00	1	9.40E+01	1	3.94E-08	2.19E-03	2.48E-03
Naphthalene	1.30E-06	1.04E-03	1.31E-04	6.48E+00	9.32E-05	4.26E-04	1.20E-05	n/a	n/a	9.00E+00	4.8	n/a	n/a	n/a	6.41E-06	n/a
PAHs (as benzo(a)pyrene)	2.20E-06	1.76E-03	2.21E-04	1.10E+01	1.58E-04	7.21E-04	2.04E-05	1.70E-03	7.12	n/a	n/a	n/a	n/a	2.46E-07	n/a	n/a
Propylene Oxide	2.90E-05	2.31E-02	2.91E-03	1.45E+02	2.08E-03	9.51E-03	2.68E-04	3.70E-06	1	3.00E+01	1	3.10E+03	1	9.93E-10	8.94E-06	3.07E-06
Toluene	1.30E-04	1.04E-01	1.31E-02	6.48E+02	9.32E-03	4.26E-02	1.20E-03	n/a	n/a	3.00E+02	1	3.70E+04	1	n/a	4.01E-06	1.15E-06
Xylenes	6.40E-05	5.11E-02	6.43E-03	3.19E+02	4.59E-03	2.10E-02	5.92E-04	n/a	n/a	7.00E+02	1	2.20E+04	1	n/a	8.46E-07	9.54E-07
SUM														***2.9E-07***	***0.006***	***0.015***
Exceed Thresholds??														NO	NO	NO
Max. hrs/yr increase:														8760	8760	n/a

-- Natural gas heat value (HHV) is value typically used by SDAPCD

-- Emission factors from U.S. EPA AP-42, Section 3.1.

-- Cancer URFs are final values currently accepted by OEHHA and APCD; chronic and acute REL values are those adopted by OEHHA in May 2000

-- MPF factors are those provided by SDAPCD; MPF for PAHs is 7.12 for benzo(a)pyrene as recommended by Tom Weeks of the APCD.

-- Chronic and acute HI values summed across all target organs; results are conservative

-- Maximum one-hour and annual impacts anywhere were selected

RAMCO - Chula Vista, CA

Ammonia Slip Emission Factor Calculation - Turbine 2 Phase 2 [1]

Ammonia Slip (ppm):	10
Exhaust Temp (deg F):	818
Exhaust Temp (deg K):	710
Exhaust Flow (acfm):	1,179,078
Fuel Use (MMscf/hr):	0.79773745
Heat Rate (MMBTU/hr):	798

lb NH3/scf	**scf Emiss/hr**	**lb NH3/hr**	**Emission Factor** ***lb NH3 emission per MMscf natural gas***	**Emission Factor** ***lb NH3 emission per MMBTU***
4.73E-07	2.72E+07	12.88	16.1	1.61E-02

[1] Follows calculation from D. Brightman at SDAPCD

CASE B: HRA CALCULATIONS

RAMCO - Chula Vista, CA

Case B(1a) - Rule 1200 Health Risk Assessment for Standard Operations Emissions - Turbine 1 With SCR Controls

10-May-01

Turbine Output (MW):	44
Heat Rate (Btu/kwh):	15,637
Heat Rate (MMBTU/hr):	688
Btu/cf Conversion:	1,000
Annual Operating Hours:	1130
Max. 1-Hr. X/Q	3.77
Max. Annual Avg. X/Q	0.14

		Emission Rates				Max.	Max.	Cancer		Chronic		Acute	Acute	Maximum		
	Emission Factor	Hourly		Annual		1-Hour	Ann. Conc.	Inh URF	Cancer	Inh REL	Chronic	REL	REL Avg.	Cancer	Chronic	Acute
Substance	(lb/MMBTU)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(ug/m3)	(ug/m3)	(ug/m3)-1	MPF	(ug/m3)	MPF	(ug/m3)	Time (hrs)	Risk	HI	HI
Acetaldehyde	4.00E-05	2.75E-02	3.47E-03	3.11E+01	4.47E-04	1.31E-02	6.35E-05	2.70E-06	1	9.00E+00	1	n/a	n/a	1.72E-10	7.06E-06	n/a
Acrolein	6.40E-06	4.40E-03	5.55E-04	4.98E+00	7.16E-05	2.09E-03	1.02E-05	n/a	n/a	2.00E-02	1	1.90E-01	1	n/a	5.08E-04	1.10E-02
Ammonia	1.71E-02	1.18E+01	1.48E+00	1.33E+04	1.92E-01	5.60E+00	2.72E-02	n/a	n/a	2.00E+02	1	3.20E+03	1	n/a	1.36E-04	1.75E-03
Benzene	1.20E-05	8.26E-03	1.04E-03	9.33E+00	1.34E-04	3.92E-03	1.91E-05	2.90E-05	1	6.00E+01	1	1.30E+03	6	5.53E-10	3.18E-07	3.02E-06
1,3-Butadiene	4.30E-07	2.96E-04	3.73E-05	3.34E-01	4.81E-06	1.41E-04	6.83E-07	1.70E-04	1	n/a	n/a	n/a	n/a	1.16E-10	n/a	n/a
Ethylbenzene	3.20E-05	2.20E-02	2.77E-03	2.49E+01	3.58E-04	1.05E-02	5.08E-05	n/a	n/a	2.00E+03	1	n/a	n/a	n/a	2.54E-08	n/a
Formaldehyde	7.10E-04	4.88E-01	6.15E-02	5.52E+02	7.94E-03	2.32E-01	1.13E-03	6.00E-06	1	3.00E+00	1	9.40E+01	1	6.77E-09	3.76E-04	2.47E-03
Naphthalene	1.30E-06	8.94E-04	1.13E-04	1.01E+00	1.45E-05	4.25E-04	2.07E-06	n/a	n/a	9.00E+00	4.8	n/a	n/a	n/a	1.10E-06	n/a
PAHs (as benzo(a)pyrene)	2.20E-06	1.51E-03	1.91E-04	1.71E+00	2.46E-05	7.19E-04	3.49E-06	1.70E-03	7.12	n/a	n/a	n/a	n/a	4.23E-08	n/a	n/a
Propylene Oxide	2.90E-05	2.00E-02	2.51E-03	2.25E+01	3.24E-04	9.48E-03	4.61E-05	3.70E-06	1	3.00E+01	1	3.10E+03	1	1.70E-10	1.54E-06	3.06E-06
Toluene	1.30E-04	8.94E-02	1.13E-02	1.01E+02	1.45E-03	4.25E-02	2.07E-04	n/a	n/a	3.00E+02	1	3.70E+04	1	n/a	6.88E-07	1.15E-06
Xylenes	6.40E-05	4.40E-02	5.55E-03	4.98E+01	7.16E-04	2.09E-02	1.02E-04	n/a	n/a	7.00E+02	1	2.20E+04	1	n/a	1.45E-07	9.51E-07
SUM														***5.0E-08***	***0.001***	***0.015***
Exceed Thresholds??														NO	NO	NO
Max. hrs/yr increase:														8760	8760	n/a

-- Natural gas heat value (HHV) is value typically used by SDAPCD

-- Emission factors from U.S. EPA AP-42, Section 3.1.

-- Cancer URFs are final values currently accepted by OEHHA and APCD; chronic and acute REL values are those adopted by OEHHA in May 2000

-- MPF factors are those provided by SDAPCD; MPF for PAHs is 7.12 for benzo(a)pyrene as recommended by Tom Weeks of the APCD.

-- Chronic and acute HI values summed across all target organs; results are conservative

-- Maximum one-hour and annual impacts anywhere were selected

RAMCO - Chula Vista, CA

Ammonia Slip Emission Factor Calculation - Turbine 1 [1]

Ammonia Slip (ppm):	10
Exhaust Temp (deg F):	789
Exhaust Temp (deg K):	694
Exhaust Flow (acfm):	1,054,400
Fuel Use (MMscf/hr):	0.688
Heat Rate (MMBTU/hr):	688

lb NH3/scf	**scf Emiss/hr**	**lb NH3/hr**	**Emission Factor** ***lb NH3 emission per MMscf natural gas***	**Emission Factor** ***lb NH3 emission per MMBTU***
4.73E-07	2.49E+07	11.78	17.1	1.71E-02

[1] Follows calculation from D. Brightman at SDAPCD

RAMCO - Chula Vista, CA

Case B(1b) - Rule 1200 Health Risk Assessment for Standard Operations Emissions - Turbine 2 - Phase 1 - No SCR / Ox-Cat Controls

10-May-01

Turbine Output (MW):	58
Heat Rate (Btu/kwh):	12,784
Heat Rate (MMBTU/hr):	741
Btu/cf Conversion:	1,000
Annual Operating Hours:	1340
Max. 1-Hr. X/Q	6.44
Max. Annual Avg. X/Q	0.22

		Emission Rates				Max.	Max.	Cancer		Chronic		Acute	Acute	Maximum		
		Hourly		Annual		1-Hour	Ann. Conc.	Inh URF	Cancer	Inh REL	Chronic	REL	REL Avg.	Cancer	Chronic	Acute
Substance	**Emission Factor (lb/MMBTU)**	**(lb/hr)**	**(g/sec)**	**(lb/yr)**	**(g/sec)**	**(ug/m3)**	**(ug/m3)**	**(ug/m3)-1**	**MPF**	**(ug/m3)**	**MPF**	**(ug/m3)**	**Time (hrs)**	**Risk**	**HI**	**HI**
Acetaldehyde	4.00E-05	2.97E-02	3.74E-03	3.97E+01	5.72E-04	2.41E-02	1.28E-04	2.70E-06	1	9.00E+00	1	n/a	n/a	3.47E-10	1.43E-05	n/a
Acrolein	6.40E-06	4.75E-03	5.98E-04	6.36E+00	9.15E-05	3.85E-03	2.05E-05	n/a	n/a	2.00E-02	1	1.90E-01	1	n/a	1.03E-03	2.03E-02
Benzene	1.20E-05	8.90E-03	1.12E-03	1.19E+01	1.71E-04	7.22E-03	3.85E-05	2.90E-05	1	6.00E+01	1	1.30E+03	6	1.12E-09	6.42E-07	5.55E-06
1,3-Butadiene	4.30E-07	3.19E-04	4.02E-05	4.27E-01	6.15E-06	2.59E-04	1.38E-06	1.70E-04	1	n/a	n/a	n/a	n/a	2.35E-10	n/a	n/a
Ethylbenzene	3.20E-05	2.37E-02	2.99E-03	3.18E+01	4.57E-04	1.93E-02	1.03E-04	n/a	n/a	2.00E+03	1	n/a	n/a	n/a	5.13E-08	n/a
Formaldehyde	7.10E-04	5.26E-01	6.63E-02	7.05E+02	1.01E-02	4.27E-01	2.28E-03	6.00E-06	1	3.00E+00	1	9.40E+01	1	1.37E-08	7.59E-04	4.55E-03
Naphthalene	1.30E-06	9.64E-04	1.21E-04	1.29E+00	1.86E-05	7.82E-04	4.17E-06	n/a	n/a	9.00E+00	4.8	n/a	n/a	n/a	2.22E-06	n/a
PAHs (as benzo(a)pyrene)	2.20E-06	1.63E-03	2.06E-04	2.19E+00	3.14E-05	1.32E-03	7.06E-06	1.70E-03	7.12	n/a	n/a	n/a	n/a	8.54E-08	n/a	n/a
Propylene Oxide	2.90E-05	2.15E-02	2.71E-03	2.88E+01	4.14E-04	1.75E-02	9.31E-05	3.70E-06	1	3.00E+01	1	3.10E+03	1	3.44E-10	3.10E-06	5.63E-06
Toluene	1.30E-04	9.64E-02	1.21E-02	1.29E+02	1.86E-03	7.82E-02	4.17E-04	n/a	n/a	3.00E+02	1	3.70E+04	1	n/a	1.39E-06	2.11E-06
Xylenes	6.40E-05	4.75E-02	5.98E-03	6.36E+01	9.15E-04	3.85E-02	2.05E-04	n/a	n/a	7.00E+02	1	2.20E+04	1	n/a	2.93E-07	1.75E-06
SUM														***1.0E-07***	***0.002***	***0.025***
Exceed Thresholds??														NO	NO	NO
Max. hrs/yr increase:														8760	8760	n/a

-- Natural gas heat value (HHV) is value typically used by SDAPCD

-- Emission factors from U.S. EPA AP-42, Section 3.1.

-- Cancer URFs are final values currently accepted by OEHHA and APCD; chronic and acute REL values are those adopted by OEHHA in May 2000

-- MPF factors are those provided by SDAPCD; MPF for PAHs is 7.12 for benzo(a)pyrene as recommended by Tom Weeks of the APCD.

-- Chronic and acute HI values summed across all target organs; results are conservative

-- Maximum one-hour and annual impacts anywhere were selected

RAMCO - Chula Vista, CA

Case B(1c) - Rule 1200 Health Risk Assessment - Combination of Turbine Risks
Final Project Standard Operations (Turbine 1 With SCR and Turbine 2 Phase 1 - No SCR / Ox-C
9-May-01

Substance	Maximum Risks		
	Cancer Risk	**Chronic HI**	**Acute HI**
Acetaldehyde	5.18E-10	2.13E-05	n/a
Acrolein	n/a	1.54E-03	3.13E-02
Ammonia	n/a	1.36E-04	1.75E-03
Benzene	1.67E-09	9.59E-07	8.57E-06
1,3-Butadiene	3.51E-10	n/a	n/a
Ethylbenzene	n/a	7.68E-08	n/a
Formaldehyde	2.04E-08	1.14E-03	7.01E-03
Naphthalene	n/a	3.33E-06	n/a
PAHs (as benzo(a)pyrene)	1.28E-07	n/a	n/a
Propylene Oxide	5.15E-10	4.64E-06	8.69E-06
Toluene	n/a	2.08E-06	3.26E-06
Xylenes	n/a	4.39E-07	2.70E-06
SUM	***1.5E-07***	***0.003***	***0.040***
Exceed Thresholds??	NO	NO	NO

-- Chronic and acute HI values summed across all target organs; results are conservative

RAMCO - Chula Vista, CA

Case B(2a) - Rule 1200 Health Risk Assessment for Standard Operations Emissions - Turbine 1 With SCR Controls

9-May-01

Turbine Output (MW):	44
Heat Rate (Btu/kwh):	15,637
Heat Rate (MMBTU/hr):	688
Btu/cf Conversion:	1,000
Annual Operating Hours:	4620
Max. 1-Hr. X/Q	3.77
Max. Annual Avg. X/Q	0.14

		Emission Rates				Max.	Max.	Cancer		Chronic		Acute	Acute	Maximum		
		Hourly		Annual												
Substance	Emission Factor (lb/MMBTU)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	1-Hour (ug/m3)	Ann. Conc. (ug/m3)	Inh URF (ug/m3)-1	Cancer MPF	Inh REL (ug/m3)	Chronic MPF	REL (ug/m3)	REL Avg. Time (hrs)	Cancer Risk	Chronic HI	Acute HI
Acetaldehyde	4.00E-05	2.75E-02	3.47E-03	1.27E+02	1.83E-03	1.31E-02	2.60E-04	2.70E-06	1	9.00E+00	1	n/a	n/a	7.01E-10	2.89E-05	n/a
Acrolein	6.40E-06	4.40E-03	5.55E-04	2.03E+01	2.93E-04	2.09E-03	4.16E-05	n/a	n/a	2.00E-02	1	1.90E-01	1	n/a	2.08E-03	1.10E-02
Ammonia	1.71E-02	1.18E+01	1.48E+00	5.44E+04	7.83E-01	5.60E+00	1.11E-01	n/a	n/a	2.00E+02	1	3.20E+03	1	n/a	5.56E-04	1.75E-03
Benzene	1.20E-05	8.26E-03	1.04E-03	3.81E+01	5.49E-04	3.92E-03	7.79E-05	2.90E-05	1	6.00E+01	1	1.30E+03	6	2.26E-09	1.30E-06	3.02E-06
1,3-Butadiene	4.30E-07	2.96E-04	3.73E-05	1.37E+00	1.97E-05	1.41E-04	2.79E-06	1.70E-04	1	n/a	n/a	n/a	n/a	4.75E-10	n/a	n/a
Ethylbenzene	3.20E-05	2.20E-02	2.77E-03	1.02E+02	1.46E-03	1.05E-02	2.08E-04	n/a	n/a	2.00E+03	1	n/a	n/a	n/a	1.04E-07	n/a
Formaldehyde	7.10E-04	4.88E-01	6.15E-02	2.26E+03	3.25E-02	2.32E-01	4.61E-03	6.00E-06	1	3.00E+00	1	9.40E+01	1	2.77E-08	1.54E-03	2.47E-03
Naphthalene	1.30E-06	8.94E-04	1.13E-04	4.13E+00	5.94E-05	4.25E-04	8.44E-06	n/a	n/a	9.00E+00	4.8	n/a	n/a	n/a	4.50E-06	n/a
PAHs (as benzo(a)pyrene)	2.20E-06	1.51E-03	1.91E-04	6.99E+00	1.01E-04	7.19E-04	1.43E-05	1.70E-03	7.12	n/a	n/a	n/a	n/a	1.73E-07	n/a	n/a
Propylene Oxide	2.90E-05	2.00E-02	2.51E-03	9.22E+01	1.33E-03	9.48E-03	1.88E-04	3.70E-06	1	3.00E+01	1	3.10E+03	1	6.97E-10	6.28E-06	3.06E-06
Toluene	1.30E-04	8.94E-02	1.13E-02	4.13E+02	5.94E-03	4.25E-02	8.44E-04	n/a	n/a	3.00E+02	1	3.70E+04	1	n/a	2.81E-06	1.15E-06
Xylenes	6.40E-05	4.40E-02	5.55E-03	2.03E+02	2.93E-03	2.09E-02	4.16E-04	n/a	n/a	7.00E+02	1	2.20E+04	1	n/a	5.94E-07	9.51E-07
SUM														***2.0E-07***	***0.004***	***0.015***
Exceed Thresholds??														NO	NO	NO
Max. hrs/yr increase:														8760	8760	n/a

-- Natural gas heat value (HHV) is value typically used by SDAPCD

-- Emission factors from U.S. EPA AP-42, Section 3.1.

-- Cancer URFs are final values currently accepted by OEHHA and APCD; chronic and acute REL values are those adopted by OEHHA in May 2000

-- MPF factors are those provided by SDAPCD; MPF for PAHs is 7.12 for benzo(a)pyrene as recommended by Tom Weeks of the APCD.

-- Chronic and acute HI values summed across all target organs; results are conservative

-- Maximum one-hour and annual impacts anywhere were selected

RAMCO - Chula Vista, CA

Ammonia Slip Emission Factor Calculation - Turbine 1 [1]

Ammonia Slip (ppm):	10
Exhaust Temp (deg F):	789
Exhaust Temp (deg K):	694
Exhaust Flow (acfm):	1,054,400
Fuel Use (MMscf/hr):	0.688028
Heat Rate (MMBTU/hr):	688

lb NH3/scf	**scf Emiss/hr**	**lb NH3/hr**	**Emission Factor** ***lb NH3 emission per MMscf natural gas***	**Emission Factor** ***lb NH3 emission per MMBTU***
4.73E-07	2.49E+07	11.78	17.1	1.71E-02

[1] Follows calculation from D. Brightman at SDAPCD

RAMCO - Chula Vista, CA

Case B(2b) - Rule 1200 Health Risk Assessment for Standard Operations Emissions - Turbine 2 - Phase 1 - No SCR / Ox-Cat Controls

10-May-01

Turbine Output (MW):	58
Heat Rate (Btu/kwh):	12,784
Heat Rate (MMBTU/hr):	741
Btu/cf Conversion:	1,000
Annual Operating Hours:	1340
Max. 1-Hr. X/Q	6.44
Max. Annual Avg. X/Q	0.22

		Emission Rates				Max.	Max.	Cancer		Chronic		Acute	Acute	Maximum		
		Hourly		Annual		1-Hour	Ann. Conc.	Inh URF	Cancer	Inh REL	Chronic	REL	REL Avg.	Cancer	Chronic	Acute
Substance	**Emission Factor (lb/MMBTU)**	**(lb/hr)**	**(g/sec)**	**(lb/yr)**	**(g/sec)**	**(ug/m3)**	**(ug/m3)**	**(ug/m3)-1**	**MPF**	**(ug/m3)**	**MPF**	**(ug/m3)**	**Time (hrs)**	**Risk**	**HI**	**HI**
Acetaldehyde	4.00E-05	2.97E-02	3.74E-03	3.97E+01	5.72E-04	2.41E-02	1.28E-04	2.70E-06	1	9.00E+00	1	n/a	n/a	3.47E-10	1.43E-05	n/a
Acrolein	6.40E-06	4.75E-03	5.98E-04	6.36E+00	9.15E-05	3.85E-03	2.05E-05	n/a	n/a	2.00E-02	1	1.90E-01	1	n/a	1.03E-03	2.03E-02
Benzene	1.20E-05	8.90E-03	1.12E-03	1.19E+01	1.71E-04	7.22E-03	3.85E-05	2.90E-05	1	6.00E+01	1	1.30E+03	6	1.12E-09	6.42E-07	5.55E-06
1,3-Butadiene	4.30E-07	3.19E-04	4.02E-05	4.27E-01	6.15E-06	2.59E-04	1.38E-06	1.70E-04	1	n/a	n/a	n/a	n/a	2.35E-10	n/a	n/a
Ethylbenzene	3.20E-05	2.37E-02	2.99E-03	3.18E+01	4.57E-04	1.93E-02	1.03E-04	n/a	n/a	2.00E+03	1	n/a	n/a	n/a	5.13E-08	n/a
Formaldehyde	7.10E-04	5.26E-01	6.63E-02	7.05E+02	1.01E-02	4.27E-01	2.28E-03	6.00E-06	1	3.00E+00	1	9.40E+01	1	1.37E-08	7.59E-04	4.55E-03
Naphthalene	1.30E-06	9.64E-04	1.21E-04	1.29E+00	1.86E-05	7.82E-04	4.17E-06	n/a	n/a	9.00E+00	4.8	n/a	n/a	n/a	2.22E-06	n/a
PAHs (as benzo(a)pyrene)	2.20E-06	1.63E-03	2.06E-04	2.19E+00	3.14E-05	1.32E-03	7.06E-06	1.70E-03	7.12	n/a	n/a	n/a	n/a	8.54E-08	n/a	n/a
Propylene Oxide	2.90E-05	2.15E-02	2.71E-03	2.88E+01	4.14E-04	1.75E-02	9.31E-05	3.70E-06	1	3.00E+01	1	3.10E+03	1	3.44E-10	3.10E-06	5.63E-06
Toluene	1.30E-04	9.64E-02	1.21E-02	1.29E+02	1.86E-03	7.82E-02	4.17E-04	n/a	n/a	3.00E+02	1	3.70E+04	1	n/a	1.39E-06	2.11E-06
Xylenes	6.40E-05	4.75E-02	5.98E-03	6.36E+01	9.15E-04	3.85E-02	2.05E-04	n/a	n/a	7.00E+02	1	2.20E+04	1	n/a	2.93E-07	1.75E-06
SUM														***1.0E-07***	***0.002***	***0.025***
Exceed Thresholds??														NO	NO	NO
Max. hrs/yr increase:														8760	8760	n/a

-- Natural gas heat value (HHV) is value typically used by SDAPCD

-- Emission factors from U.S. EPA AP-42, Section 3.1.

-- Cancer URFs are final values currently accepted by OEHHA and APCD; chronic and acute REL values are those adopted by OEHHA in May 2000

-- MPF factors are those provided by SDAPCD; MPF for PAHs is 7.12 for benzo(a)pyrene as recommended by Tom Weeks of the APCD.

-- Chronic and acute HI values summed across all target organs; results are conservative

-- Maximum one-hour and annual impacts anywhere were selected

CASE C: HRA CALCULATIONS

RAMCO - Chula Vista, CA

Case C(1a) - Rule 1200 Health Risk Assessment for Standard Operations Emissions - Turbine 1 With SCR Controls

9-May-01

Turbine Output (MW):	44
Heat Rate (Btu/kwh):	15,637
Heat Rate (MMBTU/hr):	688
Btu/cf Conversion:	1,000
Annual Operating Hours:	600
Max. 1-Hr. X/Q	3.77
Max. Annual Avg. X/Q	0.14

		Emission Rates				Max.	Max.	Cancer		Chronic		Acute	Acute	Maximum		
	Emission Factor	Hourly		Annual		1-Hour	Ann. Conc.	Inh URF	Cancer	Inh REL	Chronic	REL	REL Avg.	Cancer	Chronic	Acute
Substance	(lb/MMBTU)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(ug/m3)	(ug/m3)	(ug/m3)-1	MPF	(ug/m3)	MPF	(ug/m3)	Time (hrs)	Risk	HI	HI
Acetaldehyde	4.00E-05	2.75E-02	3.47E-03	1.65E+01	2.38E-04	1.31E-02	3.37E-05	2.70E-06	1	9.00E+00	1	n/a	n/a	9.11E-11	3.75E-06	n/a
Acrolein	6.40E-06	4.40E-03	5.55E-04	2.64E+00	3.80E-05	2.09E-03	5.40E-06	n/a	n/a	2.00E-02	1	1.90E-01	1	n/a	2.70E-04	1.10E-02
Ammonia	1.71E-02	1.18E+01	1.48E+00	7.07E+03	1.02E-01	5.60E+00	1.44E-02	n/a	n/a	2.00E+02	1	3.20E+03	1	n/a	7.22E-05	1.75E-03
Benzene	1.20E-05	8.26E-03	1.04E-03	4.95E+00	7.13E-05	3.92E-03	1.01E-05	2.90E-05	1	6.00E+01	1	1.30E+03	6	2.94E-10	1.69E-07	3.02E-06
1,3-Butadiene	4.30E-07	2.96E-04	3.73E-05	1.78E-01	2.55E-06	1.41E-04	3.63E-07	1.70E-04	1	n/a	n/a	n/a	n/a	6.17E-11	n/a	n/a
Ethylbenzene	3.20E-05	2.20E-02	2.77E-03	1.32E+01	1.90E-04	1.05E-02	2.70E-05	n/a	n/a	2.00E+03	1	n/a	n/a	n/a	1.35E-08	n/a
Formaldehyde	7.10E-04	4.88E-01	6.15E-02	2.93E+02	4.22E-03	2.32E-01	5.99E-04	6.00E-06	1	3.00E+00	1	9.40E+01	1	3.59E-09	2.00E-04	2.47E-03
Naphthalene	1.30E-06	8.94E-04	1.13E-04	5.37E-01	7.72E-06	4.25E-04	1.10E-06	n/a	n/a	9.00E+00	4.8	n/a	n/a	n/a	5.85E-07	n/a
PAHs (as benzo(a)pyrene)	2.20E-06	1.51E-03	1.91E-04	9.08E-01	1.31E-05	7.19E-04	1.86E-06	1.70E-03	7.12	n/a	n/a	n/a	n/a	2.25E-08	n/a	n/a
Propylene Oxide	2.90E-05	2.00E-02	2.51E-03	1.20E+01	1.72E-04	9.48E-03	2.45E-05	3.70E-06	1	3.00E+01	1	3.10E+03	1	9.05E-11	8.15E-07	3.06E-06
Toluene	1.30E-04	8.94E-02	1.13E-02	5.37E+01	7.72E-04	4.25E-02	1.10E-04	n/a	n/a	3.00E+02	1	3.70E+04	1	n/a	3.65E-07	1.15E-06
Xylenes	6.40E-05	4.40E-02	5.55E-03	2.64E+01	3.80E-04	2.09E-02	5.40E-05	n/a	n/a	7.00E+02	1	2.20E+04	1	n/a	7.71E-08	9.51E-07
SUM														***2.7E-08***	***0.001***	***0.015***
Exceed Thresholds??														NO	NO	NO
Max. hrs/yr increase:														8760	8760	n/a

-- Natural gas heat value (HHV) is value typically used by SDAPCD

-- Emission factors from U.S. EPA AP-42, Section 3.1.

-- Cancer URFs are final values currently accepted by OEHHA and APCD; chronic and acute REL values are those adopted by OEHHA in May 2000

-- MPF factors are those provided by SDAPCD; MPF for PAHs is 7.12 for benzo(a)pyrene as recommended by Tom Weeks of the APCD.

-- Chronic and acute HI values summed across all target organs; results are conservative

-- Maximum one-hour and annual impacts anywhere were selected

RAMCO - Chula Vista, CA

Ammonia Slip Emission Factor Calculation - Turbine 1 [1]

Ammonia Slip (ppm):	10
Exhaust Temp (deg F):	789
Exhaust Temp (deg K):	694
Exhaust Flow (acfm):	1,054,400
Fuel Use (MMscf/hr):	0.688
Heat Rate (MMBTU/hr):	688

lb NH3/scf	**scf Emiss/hr**	**lb NH3/hr**	**Emission Factor** ***lb NH3 emission per MMscf natural gas***	**Emission Factor** ***lb NH3 emission per MMBTU***
4.73E-07	2.49E+07	11.78	17.1	1.71E-02

[1] Follows calculation from D. Brightman at SDAPCD

RAMCO - Chula Vista, CA

Case C(1b) - Rule 1200 Health Risk Assessment for Variance Emissions - Turbine 2 - Phase 1 - No SCR Controls

10-May-01

Turbine Output (MW):	58
Heat Rate (Btu/kwh):	12,784
Heat Rate (MMBTU/hr):	741
Btu/cf Conversion:	1,000
Annual Operating Hours:	600
Max. 1-Hr. X/Q	6.44
Max. Annual Avg. X/Q	0.22

		Emission Rates				Max.	Max.	Cancer		Chronic		Acute	Acute	Maximum		
	Emission Factor	Hourly		Annual		1-Hour	Ann. Conc.	Inh URF	Cancer	Inh REL	Chronic	REL	REL Avg.	Cancer	Chronic	Acute
Substance	(lb/MMBTU)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(ug/m3)	(ug/m3)	(ug/m3)-1	MPF	(ug/m3)	MPF	(ug/m3)	Time (hrs)	Risk	HI	HI
Acetaldehyde	4.00E-05	2.97E-02	3.74E-03	1.78E+01	2.56E-04	2.41E-02	5.75E-05	2.70E-06	1	9.00E+00	1	n/a	n/a	1.55E-10	6.39E-06	n/a
Acrolein	6.40E-06	4.75E-03	5.98E-04	2.85E+00	4.10E-05	3.85E-03	9.19E-06	n/a	n/a	2.00E-02	1	1.90E-01	1	n/a	4.60E-04	2.03E-02
Benzene	1.20E-05	8.90E-03	1.12E-03	5.34E+00	7.68E-05	7.22E-03	1.72E-05	2.90E-05	1	6.00E+01	1	1.30E+03	6	5.00E-10	2.87E-07	5.55E-06
1,3-Butadiene	4.30E-07	3.19E-04	4.02E-05	1.91E-01	2.75E-06	2.59E-04	6.18E-07	1.70E-04	1	n/a	n/a	n/a	n/a	1.05E-10	n/a	n/a
Ethylbenzene	3.20E-05	2.37E-02	2.99E-03	1.42E+01	2.05E-04	1.93E-02	4.60E-05	n/a	n/a	2.00E+03	1	n/a	n/a	n/a	2.30E-08	n/a
Formaldehyde	7.10E-04	5.26E-01	6.63E-02	3.16E+02	4.54E-03	4.27E-01	1.02E-03	6.00E-06	1	3.00E+00	1	9.40E+01	1	6.12E-09	3.40E-04	4.55E-03
Naphthalene	1.30E-06	9.64E-04	1.21E-04	5.78E-01	8.32E-06	7.82E-04	1.87E-06	n/a	n/a	9.00E+00	4.8	n/a	n/a	n/a	9.96E-07	n/a
PAHs (as benzo(a)pyrene)	2.20E-06	1.63E-03	2.06E-04	9.79E-01	1.41E-05	1.32E-03	3.16E-06	1.70E-03	7.12	n/a	n/a	n/a	n/a	3.83E-08	n/a	n/a
Propylene Oxide	2.90E-05	2.15E-02	2.71E-03	1.29E+01	1.86E-04	1.75E-02	4.17E-05	3.70E-06	1	3.00E+01	1	3.10E+03	1	1.54E-10	1.39E-06	5.63E-06
Toluene	1.30E-04	9.64E-02	1.21E-02	5.78E+01	8.32E-04	7.82E-02	1.87E-04	n/a	n/a	3.00E+02	1	3.70E+04	1	n/a	6.23E-07	2.11E-06
Xylenes	6.40E-05	4.75E-02	5.98E-03	2.85E+01	4.10E-04	3.85E-02	9.19E-05	n/a	n/a	7.00E+02	1	2.20E+04	1	n/a	1.31E-07	1.75E-06
SUM														***4.5E-08***	***0.001***	***0.025***
Exceed Thresholds??														NO	NO	NO
Max. hrs/yr increase:														8760	8760	n/a

-- Natural gas heat value (HHV) is value typically used by SDAPCD

-- Emission factors from U.S. EPA AP-42, Section 3.1.

-- Cancer URFs are final values currently accepted by OEHHA and APCD; chronic and acute REL values are those adopted by OEHHA in May 2000

-- MPF factors are those provided by SDAPCD; MPF for PAHs is 7.12 for benzo(a)pyrene as recommended by Tom Weeks of the APCD.

-- Chronic and acute HI values summed across all target organs; results are conservative

-- Maximum one-hour and annual impacts anywhere were selected

RAMCO - Chula Vista, CA

Case C(1c) - Rule 1200 Health Risk Assessment - Combination of Turbine Risks
Turbine 1 Standard Operations With SCR and Turbine 2 Phase 1 Variance
Emissions No SCR - Concurrent Operations
9-May-01

Substance	Maximum Risks		
	Cancer Risk	**Chronic HI**	**Acute HI**
Acetaldehyde	2.46E-10	1.01E-05	n/a
Acrolein	n/a	7.30E-04	3.13E-02
Ammonia	n/a	7.22E-05	1.75E-03
Benzene	7.93E-10	4.56E-07	8.57E-06
1,3-Butadiene	1.67E-10	n/a	n/a
Ethylbenzene	n/a	3.65E-08	n/a
Formaldehyde	9.71E-09	5.40E-04	7.01E-03
Naphthalene	n/a	1.58E-06	n/a
PAHs (as benzo(a)pyrene)	6.07E-08	n/a	n/a
Propylene Oxide	2.45E-10	2.20E-06	8.69E-06
Toluene	n/a	9.88E-07	3.26E-06
Xylenes	n/a	2.08E-07	2.70E-06
SUM	***7.2E-08***	***0.001***	***0.040***
Exceed Thresholds??	NO	NO	NO

-- Chronic and acute HI values summed across all target organs; results are conservative

RAMCO - Chula Vista, CA

Case C(2a) - Rule 1200 Health Risk Assessment for Standard Operations Emissions - Turbine 1 With SCR Controls

9-May-01

Turbine Output (MW):	44
Heat Rate (Btu/kwh):	15,637
Heat Rate (MMBTU/hr):	688
Btu/cf Conversion:	1,000
Annual Operating Hours:	4620
Max. 1-Hr. X/Q	3.77
Max. Annual Avg. X/Q	0.14

		Emission Rates				Max.	Max.	Cancer		Chronic		Acute	Acute	Maximum		
		Hourly		Annual												
Substance	Emission Factor (lb/MMBTU)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	1-Hour (ug/m3)	Ann. Conc. (ug/m3)	Inh URF (ug/m3)-1	Cancer MPF	Inh REL (ug/m3)	Chronic MPF	REL (ug/m3)	REL Avg. Time (hrs)	Cancer Risk	Chronic HI	Acute HI
Acetaldehyde	4.00E-05	2.75E-02	3.47E-03	1.27E+02	1.83E-03	1.31E-02	2.60E-04	2.70E-06	1	9.00E+00	1	n/a	n/a	7.01E-10	2.89E-05	n/a
Acrolein	6.40E-06	4.40E-03	5.55E-04	2.03E+01	2.93E-04	2.09E-03	4.16E-05	n/a	n/a	2.00E-02	1	1.90E-01	1	n/a	2.08E-03	1.10E-02
Ammonia	1.71E-02	1.18E+01	1.48E+00	5.44E+04	7.83E-01	5.60E+00	1.11E-01	n/a	n/a	2.00E+02	1	3.20E+03	1	n/a	5.56E-04	1.75E-03
Benzene	1.20E-05	8.26E-03	1.04E-03	3.81E+01	5.49E-04	3.92E-03	7.79E-05	2.90E-05	1	6.00E+01	1	1.30E+03	6	2.26E-09	1.30E-06	3.02E-06
1,3-Butadiene	4.30E-07	2.96E-04	3.73E-05	1.37E+00	1.97E-05	1.41E-04	2.79E-06	1.70E-04	1	n/a	n/a	n/a	n/a	4.75E-10	n/a	n/a
Ethylbenzene	3.20E-05	2.20E-02	2.77E-03	1.02E+02	1.46E-03	1.05E-02	2.08E-04	n/a	n/a	2.00E+03	1	n/a	n/a	n/a	1.04E-07	n/a
Formaldehyde	7.10E-04	4.88E-01	6.15E-02	2.26E+03	3.25E-02	2.32E-01	4.61E-03	6.00E-06	1	3.00E+00	1	9.40E+01	1	2.77E-08	1.54E-03	2.47E-03
Naphthalene	1.30E-06	8.94E-04	1.13E-04	4.13E+00	5.94E-05	4.25E-04	8.44E-06	n/a	n/a	9.00E+00	4.8	n/a	n/a	n/a	4.50E-06	n/a
PAHs (as benzo(a)pyrene)	2.20E-06	1.51E-03	1.91E-04	6.99E+00	1.01E-04	7.19E-04	1.43E-05	1.70E-03	7.12	n/a	n/a	n/a	n/a	1.73E-07	n/a	n/a
Propylene Oxide	2.90E-05	2.00E-02	2.51E-03	9.22E+01	1.33E-03	9.48E-03	1.88E-04	3.70E-06	1	3.00E+01	1	3.10E+03	1	6.97E-10	6.28E-06	3.06E-06
Toluene	1.30E-04	8.94E-02	1.13E-02	4.13E+02	5.94E-03	4.25E-02	8.44E-04	n/a	n/a	3.00E+02	1	3.70E+04	1	n/a	2.81E-06	1.15E-06
Xylenes	6.40E-05	4.40E-02	5.55E-03	2.03E+02	2.93E-03	2.09E-02	4.16E-04	n/a	n/a	7.00E+02	1	2.20E+04	1	n/a	5.94E-07	9.51E-07
SUM														***2.0E-07***	***0.004***	***0.015***
Exceed Thresholds??														NO	NO	NO
Max. hrs/yr increase:														8760	8760	n/a

-- Natural gas heat value (HHV) is value typically used by SDAPCD

-- Emission factors from U.S. EPA AP-42, Section 3.1.

-- Cancer URFs are final values currently accepted by OEHHA and APCD; chronic and acute REL values are those adopted by OEHHA in May 2000

-- MPF factors are those provided by SDAPCD; MPF for PAHs is 7.12 for benzo(a)pyrene as recommended by Tom Weeks of the APCD.

-- Chronic and acute HI values summed across all target organs; results are conservative

-- Maximum one-hour and annual impacts anywhere were selected

RAMCO - Chula Vista, CA

Ammonia Slip Emission Factor Calculation - Turbine 1 [1]

Ammonia Slip (ppm):	10
Exhaust Temp (deg F):	789
Exhaust Temp (deg K):	694
Exhaust Flow (acfm):	1,054,400
Fuel Use (MMscf/hr):	0.688028
Heat Rate (MMBTU/hr):	688

lb NH3/scf	**scf Emiss/hr**	**lb NH3/hr**	**Emission Factor** ***lb NH3 emission per MMscf natural gas***	**Emission Factor** ***lb NH3 emission per MMBTU***
4.73E-07	2.49E+07	11.78	17.1	1.71E-02

[1] Follows calculation from D. Brightman at SDAPCD

RAMCO - Chula Vista, CA

Case C(2b) - Rule 1200 Health Risk Assessment for Variance Emissions - Turbine 2 - Phase 1 - No SCR / Ox-Cat Controls

10-May-01

Turbine Output (MW):	58
Heat Rate (Btu/kwh):	12,784
Heat Rate (MMBTU/hr):	741
Btu/cf Conversion:	1,000
Annual Operating Hours:	600
Max. 1-Hr. X/Q	6.44
Max. Annual Avg. X/Q	0.22

		Emission Rates				Max.	Max.	Cancer		Chronic		Acute	Acute	Maximum		
	Emission Factor	Hourly		Annual		1-Hour	Ann. Conc.	Inh URF	Cancer	Inh REL	Chronic	REL	REL Avg.	Cancer	Chronic	Acute
Substance	(lb/MMBTU)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(ug/m3)	(ug/m3)	(ug/m3)-1	MPF	(ug/m3)	MPF	(ug/m3)	Time (hrs)	Risk	HI	HI
Acetaldehyde	4.00E-05	2.97E-02	3.74E-03	1.78E+01	2.56E-04	2.41E-02	5.75E-05	2.70E-06	1	9.00E+00	1	n/a	n/a	1.55E-10	6.39E-06	n/a
Acrolein	6.40E-06	4.75E-03	5.98E-04	2.85E+00	4.10E-05	3.85E-03	9.19E-06	n/a	n/a	2.00E-02	1	1.90E-01	1	n/a	4.60E-04	2.03E-02
Benzene	1.20E-05	8.90E-03	1.12E-03	5.34E+00	7.68E-05	7.22E-03	1.72E-05	2.90E-05	1	6.00E+01	1	1.30E+03	6	5.00E-10	2.87E-07	5.55E-06
1,3-Butadiene	4.30E-07	3.19E-04	4.02E-05	1.91E-01	2.75E-06	2.59E-04	6.18E-07	1.70E-04	1	n/a	n/a	n/a	n/a	1.05E-10	n/a	n/a
Ethylbenzene	3.20E-05	2.37E-02	2.99E-03	1.42E+01	2.05E-04	1.93E-02	4.60E-05	n/a	n/a	2.00E+03	1	n/a	n/a	n/a	2.30E-08	n/a
Formaldehyde	7.10E-04	5.26E-01	6.63E-02	3.16E+02	4.54E-03	4.27E-01	1.02E-03	6.00E-06	1	3.00E+00	1	9.40E+01	1	6.12E-09	3.40E-04	4.55E-03
Naphthalene	1.30E-06	9.64E-04	1.21E-04	5.78E-01	8.32E-06	7.82E-04	1.87E-06	n/a	n/a	9.00E+00	4.8	n/a	n/a	n/a	9.96E-07	n/a
PAHs (as benzo(a)pyrene)	2.20E-06	1.63E-03	2.06E-04	9.79E-01	1.41E-05	1.32E-03	3.16E-06	1.70E-03	7.12	n/a	n/a	n/a	n/a	3.83E-08	n/a	n/a
Propylene Oxide	2.90E-05	2.15E-02	2.71E-03	1.29E+01	1.86E-04	1.75E-02	4.17E-05	3.70E-06	1	3.00E+01	1	3.10E+03	1	1.54E-10	1.39E-06	5.63E-06
Toluene	1.30E-04	9.64E-02	1.21E-02	5.78E+01	8.32E-04	7.82E-02	1.87E-04	n/a	n/a	3.00E+02	1	3.70E+04	1	n/a	6.23E-07	2.11E-06
Xylenes	6.40E-05	4.75E-02	5.98E-03	2.85E+01	4.10E-04	3.85E-02	9.19E-05	n/a	n/a	7.00E+02	1	2.20E+04	1	n/a	1.31E-07	1.75E-06
SUM														***4.5E-08***	***0.001***	***0.025***
Exceed Thresholds??														NO	NO	NO
Max. hrs/yr increase:														8760	8760	n/a

-- Natural gas heat value (HHV) is value typically used by SDAPCD

-- Emission factors from U.S. EPA AP-42, Section 3.1.

-- Cancer URFs are final values currently accepted by OEHHA and APCD; chronic and acute REL values are those adopted by OEHHA in May 2000

-- MPF factors are those provided by SDAPCD; MPF for PAHs is 7.12 for benzo(a)pyrene as recommended by Tom Weeks of the APCD.

-- Chronic and acute HI values summed across all target organs; results are conservative

-- Maximum one-hour and annual impacts anywhere were selected

BACT EVALUATION

NO_x, VOC, PM_{10}, SO_2 and NH_3 BACT Summary for Simple-Cycle FT4C-3F Gas Turbines

May 2001

for

RAMCO, Incorporated
San Diego, California

Submitted by:

A Resource Catalysts Project Team
San Diego, California

BACT SUMMARY

RAMCO, Incorporated (RAMCO) proposes to install one pair of simple cycle Pratt & Whitney FT4C-3F gas turbines (FT4C-3F) at the Chula Vista Power Plant facility in Chula Vista California. The proposed unit will consist of two natural gas fired combustion turbines that drive one electric generator. The proposed unit, the second at this site, will be an expansion of the existing facility currently under construction, which has a capacity of 44 MW (ISO rated). The proposed expansion unit has rated output of 58.0 MW (ISO) during the initial installation of the facility. The turbine will be equipped during this initial installation phase with "first-of-its-kind" dry low NOx burners (DLN) for this type of turbine, but no Selective Catalytic Reduction (SCR) or CO Oxidation Catalyst (Ox-Cat). The final installation phase of the proposed expansion unit has a rated output of 62.4 MW (ISO). The turbines will be retrofitted at this time with SCR and with CO Ox-Cat. The maximum output the initial plant installation will be 102 MW (ISO rated). The final plant installation maximum output will be 106.4 MW.

BACT is triggered for NOx, VOC, PM_{10}, SO_2 and NH_3. The turbines evaluated in this document will be equipped with DLNs to achieve a 25 ppm NO_x level at the combustor outlet for the initial installation. For the final installation, an end-of-pipe NO_x SCR control technology is proposed for retrofit to reduce outlet NO_x emissions to 5 ppm. Likewise, CO Ox-Cat control technology is proposed for retrofit to reduce emissions of CO and VOC from the proposed unit. Either the existing aqueous ammonia storage and supply system at the adjacent site, or a new storage system dedicated to these turbines, will provide ammonia for the SCR. Annual NO_x emissions from the FT4C-3Fs (as well as the existing turbine) will be less than 50 tons per year (TPY) for NOx. The purpose of the installation will be to provide additional power to the grid during periods of high electricity demand.

DLN with SCR is a technically feasible NO_x control method currently available to achieve a NO_x outlet emission level of 5 ppm on the FT4C-3F gas turbine. A CO Ox-Cat is a technically feasible CO and VOC control method. SCONO$_x$™ technology is not considered technically feasible in this application because of the 700 ^oF maximum temperature limitation of this technology. Catalytic combustion is still in a pre-commercialization advanced R&D phase.

The emissions from the proposed simple cycle FT4C-3F gas turbine installation are comparable to the San Diego Air Pollution Control District (District) acceptance of a Best Available Control Technology (BACT) determination for the current simple cycle gas turbine. The District based its determination, in part, on the BACT guidelines prepared by the California Air Resources Board (CARB) (June 1999) for simple cycle turbines subject to California Energy Commission (CEC) authority. Installations at or above 50 MW are subject to CEC authority. The proposed installation is subject to CEC authority and being permitted concurrently under the CEC's emergency 21-day permitting process; the emissions of NO_x, VOC, PM_{10}, SO_2 and NH_3 are based on the levels recommended by CARB in its BACT guidelines. NH_3 slip will not be more than 10 ppm. These BACT levels are as follows (reference to 15% O_2):

- NOx = 5.0 ppmvd, 3-hr rolling average; equipped with SCR
- CO = 6.0 ppmvd, 3-hr rolling average; equipped with a CO Ox-Cat
- VOC = 2.0 ppmvd, 3-hr rolling average; equipped with an CO Ox-Cat

In addition, to minimize PM_{10} and SOx emissions, only CPUC-quality natural gas will be used as fuel in combination with employing good combustion techniques.

EQUIPMENT SPECIFICATIONS

RAMCO, INC.

Peaker Project in Chula Vista, California

GT2 Unit Specifications (Preliminary)[1]

Manufacturer:	Pratt & Whitney
Model:	FT4C-3F twin pak (two engines)
Serial Numbers:	Phase 1: Gas Turbines 686768 and 686744 Phase 2: Free Turbines 600628 and 600574
Maximum Power Rating:	Phase 1: 58.0 MW Phase 2: 62.4 MW
LHV Heat Rate:	Phase 1: 11,559 Btu/kWh Phase 2: 11,559 Btu/kWh
HHV Heat Rate:	Phase 1: 12,784 Btu/kWh Phase 2: 12,784 Btu/kWh
Maximum Heat Input:	Phase 1: 741.5 MMBtu/hr @ HHV Phase 2: 797.7 MMBtu/hr @ HHV
Fuel Flow (per engine):	Phase 1: 37,075 MMscf/hr @ HHV Phase 2: 39,887 MMscf/hr @ HHV
Stack Exhaust Flow:	Phase 1: 298 lbs/sec Phase 2: 305 lb/sec
Stack Gas Temp.	Phase 1: 800 deg F Phase 2: 818 deg F

[1]A final specification sheet will be compiled, as needed. The values denoted above represent GT2 Phase 1 with DLN no SCR and no CO Ox-Cat, and GT2 Phase 2 with DLN, SCR, and CO Ox-Cat.

**For purposes of nomenclature:
GT2 = Chula Vista II
Phase 1 = Interim Phase of initial installation; refers to GT2 equipped with DLN only.
Phase 2 = Final Project; refers to GT2 equipped with DLN, SCR, and CO Ox-Cat.